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WORLD MARITIME UNIVERSITY  
MALMOE SWEDEN

## CONTAINERISATION IN BANGLADESH

BY  
GHULAM RABBANI  
BANGLADESH

A paper submitted to the Faculty of the World Maritime University in partial satisfaction of the requirements for the award of a

MASTER OF SCIENCE DEGREE  
in  
GENERAL MARITIME ADMINISTRATION

WMU LIBRARY

The contents of this paper reflect my personal views and are not necessarily endorsed by the University.

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CONTAINERISATION

IN

BANGLADESH

GHULAM RABBANI

ABSTRACT OF  
CONTAINERISATION IN BANGLADESH

The paper studies the feasibility of the development of containerisation in Bangladesh under the existing socio economic conditions .The subject is very topical for developing countries .

It is in the strong interest of Bangladesh that she should keep pace by adapting herself to the new technology of containerisation . The effects of not joining the technological progress could be detrimental for the national economy as well as for the port and shipping industry .

The paper attempts to study the development of a complete system of containerisation in Bangladesh with emphasis on the internal distribution system .

The paper also attempts to give a fair idea of what Bangladesh has in terms of infrastructure , equipment and institutional framework presently and what would be required for the development of a complete system of containerisation .

Most of the containerisable cargo originates or is destined for the Dhaka area . There are only very limited prospects for containerisation outside the Dhaka Chittagong corridor .

The paper also attempts to identify the need for a Rail based internal distribution system with an ICD at Dhaka as a minimum requirement for workability . The design and operational layout of the ICD is outside the scope of this paper .

A phased development plan seems to be appropriate here and such a plan has been proposed . Estimates of capital and operating costs of the Rail based container service and the ICD are also given .

It is stressed in the paper that it is indispensable for Bangladesh to extend , modernise and optimise her port facilities and operational capabilities for container traffic . Harmonisation of different plans for containerisation has to be made .

## PREFACE

As part of the curriculum , students at the World Maritime University (WMU) are expected to undertake a study project and produce a thesis on a maritime field in partial fulfilment of the requirements for obtaining the Masters degree.

The subject chosen for the thesis is "Containerisation in Bangladesh" . My interest on the subject was developed during the course of studies in the first year at the WMU and visits to the ports of Bremen and Bremer Haven during the field trip to Germany in October 1987 and the port of Halifax during "On the Job Training" in Canada in March '88 .

None of the students from Bangladesh at the WMU has undertaken a study project for his thesis on containerisation so far . Besides , some reference material on this subject is readily available .I being from the Navy had little knowledge of commercial shipping before coming to the WMU . The subject chosen has given me a good exposure to many aspects of commercial shipping . The subject is also very topical for developing countries .

This thesis project is intended for those readers , who while possessing a general knowledge about shipping , wish to know more , particularly about prospects and feasibility of containerised shipping , in Bangladesh.

This thesis project includes a number of quotations and many references , but the main source for this study has been the "Rail Container Transport Study - Bangladesh, Draft Final Report - Prepared for Asian Development Bank acting as executive agency for UNDP - September '87" (RCTS) and "Transport of Containers in Bangladesh - Feasibility Study and Detailed Engineering - Phase I Draft Report - Prepared for the World Bank on behalf of the UNDP - December '85" . The statistical data , maps and figures used in this study project are mostly from RCTS .

This being said I am now faced with the task of thanking the organisations and individuals , without whose help , guidance and understanding this study project would have been difficult to complete .

I shall name : Dr H L Beth , visiting profesor at the WMU who helped me formulate the outline and framework and gave me valuable advice for my thesis project ; Dr H Haralambides , lecturer at the WMU , my supervisor ; and not forgetting to mention the visiting professors and the resident staff of the WMU and the WMU librarian Mr Richard Poisson who helped me by providing valuable material and guidance during the preparation of my thesis project ; Kazi Mahbubul Huq , Director , Bangladesh Consultants Limited , who was very kind to allow me to make copies of the abpve named project reports for myself after having failed to obtain them from the Bangladesh Ministry of Ports Shipping and IWT ; Mr Omar Hadi , Chief of Planning and Mr Anwar Hossain , Deputy Chief of Planning at the Ministry of Ports Shipping and IWT both of whom briefed me

on shipping and containerisation in Bangladesh and supplied me with some material and identified for me other sources for collecting data and material ; Mr Yar Ahmed , Traffic Officer , Incharge of the Interim ICD at Kamalapur Dhaka who gave me a briefing and showed me around the facility this January .

In the end I wish to mention my wife , Mohua , who has shown a great deal of patience and understanding during her stay with me in Malmo and during the preparation of the thesis project when on many occasions she was deprived of my company when I was burning the midnight oil writing my thesis or typing it on the Word Processor at the WMU . She gave me a lot of encouragement and never complained . She has a lot of contribution in the completion of this thesis project .



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## GLOSSARY

ADB	Asian Development Bank
BG	Broad Gauge
BIWTA	Bangladesh Inland Water Transport Authority
BIWTC	Bangladesh Inland Water Transport Corporation
BNCC	Bangladesh National Container Company
BSC	Bangladesh Shipping Corporation
B/L	Bill of Lading
BR	Bangladesh Railways
CCC	Customs Cooperation Council
CFS	Container Freight Station
C&F	Cost and Freight
CIF	Cost Insurance and Freight
CPA	Chittagong Port Authority
CTD	Combined Transport Document
CTO	Combined Transport Operator
FCL	Full Container Load
FCT	Two Axle Container Wagon
FLT	Front Lift Truck
FOB	Free on Board
FY	Financial Year
GOB	Government of Bangladesh
Ha.	Hectares

ICD	Inland Clearance Depot
IWT	Inland Water Transport
Km/h	Kilometres per hour
l	length
LCL	Less than Container Load
m	million
MG	Metre Gauge
MPB	Multi Purpose Berth
NTD	National Transport Document
NVOCC	Non-Vessel Owning Common Carrier
pa	per annum
PMA	Port of Mongla Authority
RCTS	Rail Container Transport Study ,Bangladesh '87
REEFER	Refrigerated Container
RHD	Roads and Highway Department
Ro-Ro	Roll on Roll off
RTG	Rubber Tyred Gantry
TEUs	Twenty foot Equivalent Units
Tk	Taka ( Bangladesh Currency ) 1\$=Tk 33
UN	United Nations
UNDP	United Nations Development Fund
UNCTAD.	United Nations Conference on Trade and Development
%	percent

## CONTAINERISATION IN BANGLADESH

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# CONTAINERISATION IN BANGLADESH

## CHAPTER I

### INTRODUCTION

It is in the strong interest of the developing countries that they should keep pace by adapting themselves to the new technology of Containerisation . This is the modern trend in transportation and developing countries have little choice , they have to adapt their facilities to the modern transport technologies . There are a lot of reasons for developing countries , to describe the container system as being highly attractive . It is the belief of many shipping economists that the effects of not joining the technological progress , mainly , will be negative ; i e , in general , for the national economy, as well as for the port and shipping industry .

General cargo vessels dominated the ports of the developing countries during the last decades but these countries , including Bangladesh , are facing the necessity to cope with the requirements of specialised vessels now, in particular , the container vessels .

Although the trend of containerisation does not take into account the special considerations in developing countries , as , possible unemployment , low wages etc , these countries , and Bangladesh is no exception , have to prepare themselves for handling this specialised traffic in their ports.

No country interested in taking part in world traffic and trade , can accept the situation that it be excluded from the liner traffic with container vessels , because of missing upto date port facilities . For this reason , it is indispensable for Bangladesh and other developing countries , to extend , modernise and optimise their port facilities and operational capabilities for container traffic . This is already reflected in Bangladesh's current development programme . (1)

According to the Containerisation International Yearbook '85 , container traffic worldwide exceeded 55 million TEUs in 1985 . 75 % of this traffic is handled by ports in developed countries but container traffic is now growing quickly in most developing countries .

Containerisation in Bangladesh is still in its infancy . Harmonisation of different plans for containerisation has to be made . There are many examples that show that containerisation in its infant stage has produced a lot of confusion . Congesting an unadapted port with containers , instead of enjoying the benefits , will make the ports suffer from a decrease in productivity . Containerisation results in its benefits only when completeness of the system is achieved.

**Scope** . This paper attempts to study the development of a complete system of containerisation in Bangladesh . To get an idea of the setting in which containerisation is to be developed the second chapter deals with the history and socio economic condition of Bangladesh and a review of the present position of containerisation in Bangladesh.

The third chapter looks at the imports and exports of Bangladesh and her trading partners to determine the extent of demand for containerisation . It also examines the possibility of transit trade . Container traffic forecasts for the next fifteen years are provided and the modal choice is also discussed in this chapter .

The fourth chapter evaluates the facilities which exist to handle the imports and exports and handling capability for containers - i e the supply aspect .

In the fifth chapter a general evaluation of containerisation is done - taking into account the basic considerations , its advantages and problems etc , relating them to Bangladesh . The need for the introduction of containerisation in Bangladesh is also discussed .

The sixth chapter outlines the changes desired for containerisation and then goes on to list out a minimum requirement for workability .

In the seventh chapter a phased development plan is given and its financial and economic aspects are discussed .

The eighth is the concluding chapter , where the summary and conclusions of the paper are given . Some proposals/recommendations are also made.

### AIM

The aim of this paper is to study the feasibility of the development of containerisation in Bangladesh under the existing socio economic conditions .

#### REFERENCE TO CHAPTER I

- (1) Beth H L : Evaluation of Container System - Economic Impact , in ,Port Management Textbook - Containerisation . Institute of Shipping Economics and Logistics , Bremen '85 .

## CHAPTER II

### THE DEVELOPMENT OF BANGLADESH UPTO NOW

#### History

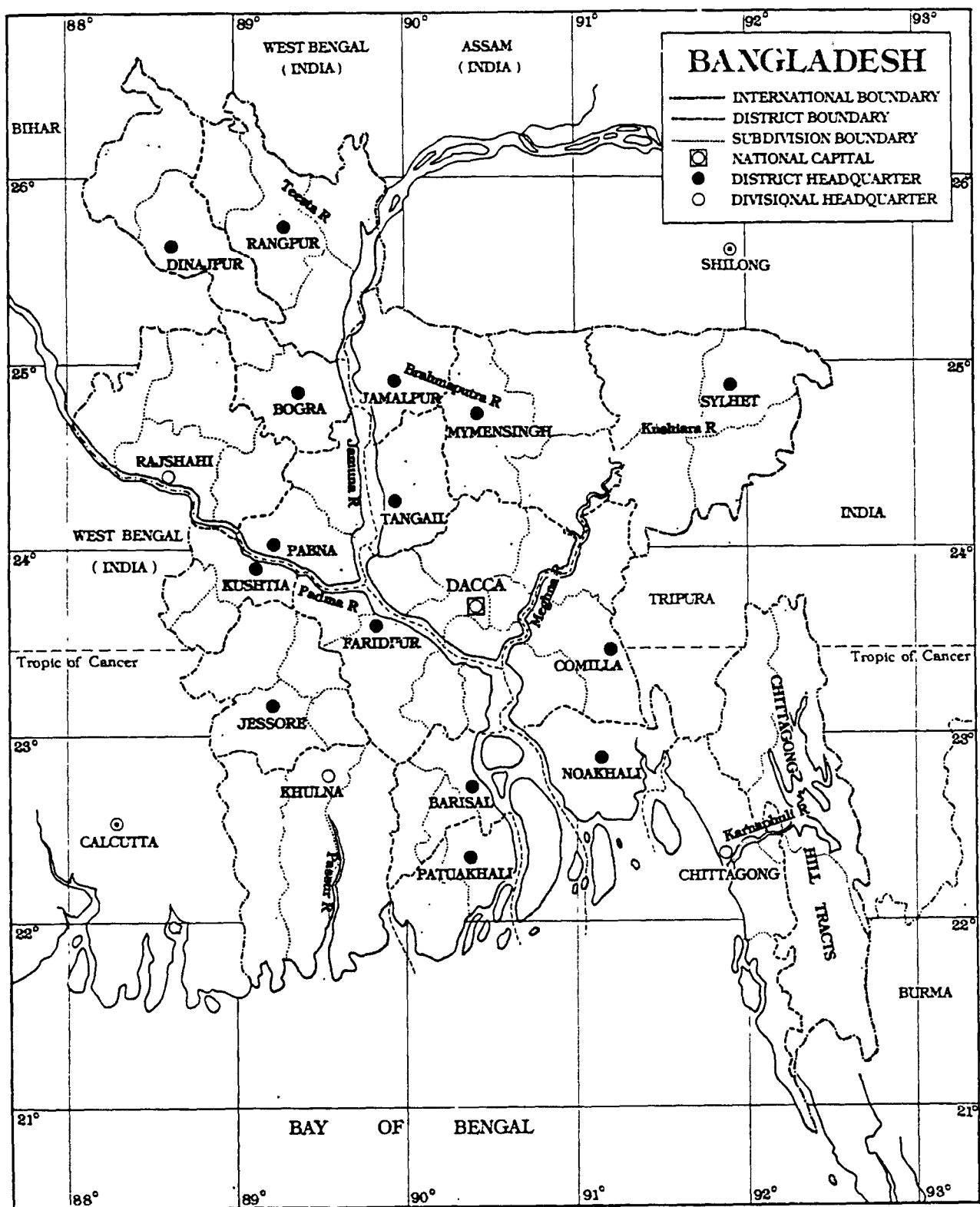
It is believed that an Austro-Asian race first inhabited the Indian sub continent in an unknown prehistoric age. Then came the Dravidians, Aryans and Mongolians. Archeological excavations show signs of powerful dynasties who ruled the land till the muslims conquered in the 11th century and established their rules. After more than 7 centuries of muslim rule, in the mid 18th century, came the British who took over from the Muslims. In 1947 the British left and the country became a part of Pakistan, the home of muslims in the Indian Sub-Continent. West Pakistan came to dominate the new nation's government and economy and the Bengalis of East Pakistan felt that they had got a new colonial master who exploited them, a feeling which through conflicts and a nine month war led to independence in December 1971. (2)

A map of Bangladesh is at Figure 2.1 .

#### Socio Economic Background

The People . In 1987 the total estimated population of Bangladesh was 105 m who are fairly evenly distributed over an area of <sup>120</sup>144000 sq km. The most important urban centres are, Dhaka, Chittagong and Khulna with populations of 4m, 2m and 1m respectively. Every year the population grows <sup>2.5</sup> by more than two and a half million people, and by the year 2000 or shortly thereafter it will exceed 150m people at a growth rate of <sup>1.25</sup> 2.6% per year. This

2.17



84

Source : Meet Bangladesh , 83

FIG NO 2.1

rate of growth is not exceptional in the Third World, but when it occurs in the world's most densely populated large country , it is disturbing . Four out of 5 people live in rural areas, and more than half of them do not own any land.

The 85% Bangladeshi's who live in rural areas are mainly engaged in agriculture , which is often practiced at or near to subsistence levels. At a national level agriculture is the largest component of GDP, contributing about 50% of total national income.

25.7.  
Less than 25% of the population ( one of four persons ) can read and five of six women are illiterate. On the other hand there are millions of young people in secondary schools , over 40000 in 6 universities in Bangladesh and a significant but unknown number abroad. The health situation is poor , infant mortality is high by international standards , 125 per 1000 , and only 2 out of 3 newborn children will live long enough to take care of their old parents . This is one major reason why parents want many sons , and explain why every women on the average will have more than 6 children. Family planning will have some effect on the birth rate , which may still exceed 40 per 1000 people, but a significant fall in fertility will hardly take place until conditions improve , more women are educated and social and economic conditions are better.

Strong traditions influence the role of women in society and active life. They don't work in the fields or in transport and only very marginally in trade in contrast to Africa . However , women play a crucial role in the economic and social life. Most of them are not counted as



members of the "labour force" , Statistics hardly include any women in agriculture , but in the subsistence economy the work of women in the homestead is an indispensable part of the economic system.

About 60 % of the labour force has its major occupation in agriculture as land owning farmers , tenant ,(share croppers) and farm workers. Other major areas of occupation are services , trade and catering , manufacturing , construction and transport. More than 16 million people work in agriculture , less than 1 million in modern manufacturing and about 0.7 million in government service. (3)

The Economy . Inspite of high population density , Bangladesh has enough land to feed a larger population much better than now and still have a surplus of farm products for export. This will only be possible if land is fully utilised , modern farm technology applied widely , and control of water extended as much as technically possible . Bangladesh is not as poor in natural resources as is generally assumed . However , it is poor in mineral resources , even though natural gas is a valuable asset of which more may be found , and possibly oil as well.

Bangladesh population has very low levels of per capita income . In 1987 GDP per head was less than Tk 5000 (US \$ 160) , one of the lowest in the world . Despite the annual GDP growth of 4 to 5 % between 1982 and 1986 the impact of high population increases has been to reduce per capita GDP growth to below 2 % . The poorest three quarters of the rural house holds use 75 % of their consumption expenditure on rice only !

One of the reasons for this poverty is the low productivity . Net output per farmer in the Scandanavian countries is 15 to 20 times as high as for farmers in Bangladesh , and the difference in manufacturing is even higher . This can be remedied by the use of modern technology , but to equip 30 million working Bangladeshis with up to date machinery and equipment would cost so large a sum that it would take many decades of savings in Bangladesh and of foreign aid to pay for it , and equally important , a massive and sustained training and education effort to enable people to use modern technologies efficiently . The illiterate or semi literate Bangladeshi has shown an impressive ability to employ modern tools and equipment , or agricultural inputs like fertilisers and seeds of high yielding varieties . But the educated elite, of course with few exceptions , has shown little managerial talent and practical sense, and much modern machinery and equipment is unused and being destroyed due to organisational weaknesses , as well as a weak sense of importance of maintenance.

Bangladesh has still some way to go to reach self sufficiency in foodgrains , it has to import. In manufacturing there has been slow advance , this is due to a relative stagnation of the important jute and cotton textile industries , while ambitious plans to expand production of engineering goods have not been fulfilled . Growth sectors have been nitrogenous fertiliser production , pharmaceutical products and in recent years ready made garments for export . Domestic commercial energy supplies have risen sharply . Electricity generation capacity and transmission and distribution networks have been expanded rapidly and so have natural gas production and distribution . Output of government services , higher quality hou-

sing and construction have also risen rapidly.

Bangladesh's balance of payments remains precarious. In money terms exports have risen more slowly than imports, of which foreign aid pay for about half. Traditional exports have risen slowly, particularly of jute and jute goods, which still account for half of all commodity exports. Two new non traditional exports, frozen food - mostly shrimps and ready made garments represent almost all the growth of such new exports. Migrants remittances from workers in Middle East had risen sharply but have declined after 1983-84 from three quarters of commodity exports to little more than half in the later years. They however remain an important source of foreign exchange.

The central government financial situation remains weak. Most of the Annual Development Programme (ADP) ie government financed investment and other development expenditure is still financed by foreign aid. On the average there is about one years lag in disbursements of commodity aid. As exports from Bangladesh will not grow fast enough to meet the country's increasing import demand, more foreign aid disbursements will be needed and this is why the Government of Bangladesh, supported by the World Bank, asks for more commodity aid, which also adds taka revenue to the Government budget.

The consultants, in the RCTS, are of the opinion that it will be very difficult and perhaps impossible to meet the overall growth target laid down in the Third Five Year Plan (1985-90) which is 5.4% per year. For this target to be achieved agriculture must grow at 4% and industry at no less than 10%. For industry to grow at such a

rate , for instance , a necessary condition would be that market outlets for Bangladesh garment exports are allowed to grow by more than 50 % per year , which is not really possible now with quota restrictions by American and European countries . Under normal conditions , the economy of Bangladesh should continue to grow, but the balance of payments situation will remain critical.

The Third Five Year Plan targets are not ambitious per se , but unfortunately , under present circumstances they seem to be unrealistic . If Bangladesh is to utilise fully its own resources - fertile land and the people , economic growth must be high and sustained . Simultaneous growth in agriculture and manufacturing is needed together with heavy investments in transport and energy infrastructure , but the level of growth and investments will depend much more on domestic mobilisation of human resources than on the inflow of foreign aid.

From independence until mid '86 , Bangladesh received US\$19.5 billion in aid commitments of which US\$10 billion were in project aid . Much of the project aid goes into expansion and improvement of infrastructure , viz irrigation , flood control and drainage , storage capacity , transport and natural gas and electricity . (3)

The major impact of aid has been to keep the economy going and to permit a slow but a fairly steady growth of GDP per head. . Food aid has prevented famine and has created employment for poorer people and has therefore had certain favourable effects on the living condition of the poor. Commodity aid has helped to maintain economic activities and thus also employment in the modern sectors , which is at the sametime creating handsome profits in

business activities . Aid flows have also increased the wealth and influence of the already mighty , and this may have created more hardship for many poor.

Poverty and Power . Poverty in Bangladesh is both rural and urban - but the rural situation is most disturbing . Millions of households have very little or no land and they depend on seasonal farmwork and non agricultural activities for survival . Most of these people suffer from nutritional deficiencies . There is of course enough land eventually to produce sufficient food for an even larger population , but not enough land to provide farm employment for the majority of the people . Rural works programme financed through Food For Work and other sources give millions of landless and sub marginal farmers some income during part of the year . Vulnerable Group Feeding programmes also assist deprived people.

The rural elite is powerful rather than rich . The patron-client relationship situation is still strong , and the clients cling to it as an ultimate security in times of distress . The larger farmers rent out land to their clients , and invest their surplus in other activities , and in education of their children , who thereby may find job in the government bureaucracy and thus reinforce the families power position .

It is common knowledge in Bangladesh that the wealthy part of the business community exercise far more power nationally than do the rural landlords and larger farmers. Import trade , including aid financed imports is a major source of easily earned money . Wealthy businessmen use their influence to make the authorities accept aid for construction projects and for machinery and equipment

which leads to profits in the construction industry and in import trade . Such incomes are also a source of corruption which few people will deny ,is widespread in Bangladesh , petty corruption , as well as large deals .

There are quite a number of well to do families in Bangladesh who own , comfortable large houses in pleasant surroundings , cars and a variety of consumer durables , and who can afford travel abroad for medical and other reasons and to educate their children in USA and European countries . Some of their incomes are based on exploitation of share croppers and factory or construction workers but much originates in trade . Yet even a drastic income redistribution would hardly improve the lot of the poor very much . However , if foreign aid ceased , much of the sources of high incomes would evaporate as well.

Power and material comfort rest with the higher ranks of the bureaucracy and the armed forces as well. Both groups hold power because of their positions and when there is no legitimate political power , military and civil service officers rule the field . Very low pay scales make them dependent on the business community , however, unless they , as often is the case have substantial - perfectly legal mostly , side incomes from ownership of land , real estate and businesses or from professional services .

Politics is also business - politicians admit to spending small fortunes to be elected as local or national government officials . Their electorates expect that the elected representatives will provide services and benefits to them and accept that these benefits have to be paid for , but will not accept excessive greed in the long run. In this social system there can be little hope that demo-

cracy in the short run will pave the way for the poor taking control of the government machinery .

Since independence Bangladesh has only in short periods lived under a pluralistic system of democratic government and by now most of the time under military rule . Except periodic excesses , and inspite of such limitations as press censorship , special military courts etc , serious offences against civil rights of the Bengali people have not been frequent. (3)

After the history and socio economic condition of Bangladesh against which to view the study we shall now review the present position of containerisation in Bangladesh.

### Brief Review of Containerisation

Maritime containerisation has grown rapidly in Bangladesh reaching a total of approximately 50000 TEUs in FY1985-86 after a relatively slow start in the FY1980-81. In Asia it started in the 70s.

The majority of import containers move through Chittagong port , but Mongla port handles a substantial volume of export containers , mostly jute . Chittagong currently handles 84 % of Bangladesh's containerised tonnage. Chittagong alone handled 50133 TEUs in 1986-87.

The number of containers handled by various South Asian ports between 1982 and 1987 are shown in Table 2.1 . The table shows that although Bangladesh still handles relatively few containers , recent growth has been very

TABLE 2.1

DEVELOPMENT OF CONTAINER HANDLING AT SELECTED  
SOUTH ASIAN PORTS IN THOUSAND TEUS

COUNTRY AND PORT	1982	1983	1984	1985	1986	1987
Pakistan (Karachi)	124.2	140.4	160.0	244.1	-	-
Sri Lanka (Colombo)	103.2	128.5	181.5	215.9	243.9(c)	-
India (Total) (b)	215.8	234.5	320.2	297.8	389.6	-
Bombay	130.7	141.3	202.0	175.1	203.7	220.0(c)
Calcutta, Haldia	33.4	32.6	46.6	38.9	53.8	67.0(c)
Cochin	32.0	31.3	35.4	37.3	44.5(c)	-
Madras	18.6	28.1	35.0	45.2	83.9	100.0
Tuticorin	0.7	1.1	1.0	1.2	3.2	4.5(c)
Visakhapatnam	0.4	0.1	0.2	0.1	0.5	0.7(c)
Bangladesh (Total)	5.9	13.3	20.7	30.4	50.3	67.1(c)
Chittagong	5.1	10.7	15.5	25.0	39.1	50.7(c)
Mongla	0.8	2.6	5.2	5.4	11.2	16.4(c)
Burma	1.5	1.0	0.9	1.0	1.1	-
Thailand (Bankok)	259.4	304.5	341.0	400.4	450.0	-
Malaysia (Total)	221.1	280.1	343.6	355.6	367.5	-
Penang	64.9	86.6	98.3	104.1	120.0(c)	-
Port Kelang	157.2	193.5	240.7	244.9	232.5(c)	-
Johor	-	-	4.6	6.6	15.0	-
Singapore (Total)	1116.3	1274.3	1552.2	1698.8	2000.0(c)	-
Total	2048.5	2376.5	2920.1	3244.8		
	(+16%)	(+32%)	(+11%)			

(a) Fiscal year ended 30 June. (b) Fiscal year ended 31 March.

(c) Estimate

Source : Containerisation International Yearbooks 1985 & 1987  
except Bangladesh (from CPA & PCA ).



fast . Chittagong and Mongla together are handling a similar volume to Calcutta and Haldia.

Container penetration , i e , the percentage of the available containerisable tonnage actually transported in containers , in Chittagong and Mongla ports both in terms of imports and exports , has increased steadily since containerisation was introduced . According to the consultants estimates in RCTS , the overall FY1986-87 figures for Bangladesh are probably about 23-24 % for imports , 8-9 % for exports and 18-19 % overall.

About 20 % of non bulk imports through Chittagong are containerised compared with more than 40 % of exports. The overall figure for Mongla is lower at around 10 % . It seems that the potential for increasing container penetration is greater at Mongla but the existing import tonnages are small , so higher container penetration would not substantially alter Mongla's overall level of containerisation . On the other hand one of Mongla's leading export commodities : raw jute is still proving to be more economically shipped in break bulk .

Most containers are stuffed or stripped in port areas in the open for institutional and technical reasons. Bangladesh Railway has introduced an interim Internal Clearance Depot ( ICD ) last year ( 1987 ) at Dhaka , with supporting rail services , and customs have been available there to undertake clearance . At present traffic levels are low but are expected to grow quickly up to the available capacity . (4&5)

Import and export cargo to and from Chittagong port is moved by the three surface modes - rail , road and

inland water transport (IWT) to and from Dhaka .

In Chittagong port , containers are currently handled at conventional berths . Light conventional cranes are provided on most berths but discharge and loading of containers are carried out by ships gear . The port is congested with a large number of stored containers , mostly empties . There exists a small facility for loading containers to rail .

A new multi purpose berth (MPB) with 450 m quay (two wharves ) is being constructed to be used primarily for containers . Construction of the quay itself with rails for quay side cranes has been completed but the supporting container storage areas and Container Freight Station without which the quay cannot operate , are yet to be built . The project is expected to be completed by 1991. The berth is being funded by the World Bank and the capacity has been assessed at 90000 TEUs p a . However it is likely that some of the port container throughput will continue to arrive at other berths on general purpose vessels even after this new berth is in operation . (6)

The rail route to Dhaka is meter gauge (MG) throughout , as is the whole rail system in East Bangladesh . The road between Chittagong and Dhaka is approximately 60 km shorter in length than the railway but currently requires two ferry crossings over the Meghna and Gumti rivers . It is being steadily upgraded but is not yet suitable for the heaviest container vehicles . Most vehicles used are only of 5 to 8 tonnes capacity . IWT services are also available but access to Chittagong requires crossing the edge of the Bay of Bengal , for which more substantial sea going vessels are needed than those required for internal

river systems .

Mongla port lies to the west of Chittagong across the Jamuna and Ganges delta . It was developed from Chalna anchorage in 1974. A new road has been constructed from Khulna , but a ferry crossing of the Rupsa river is required . The nearest rail facility is at Khulna , on the western broad gauge (BG) system . The most widely used inland transport mode at Mongla is IWT , for which river craft may be used.

Container handling started on board the vessels at Mongla port since August 1980 . However sea going vessels started to take berth alongside the permanent port jetties from July 1983 for handling containers to cope with the ever increasing container traffic . While 462 TEUs were stuffed on board the vessels during 1984-85 , the number decreased to 221 TEUs during 1985-86 . On the other hand while 4417 TEUs were handled at the jetties in 1984-85 the number increased to 10937 TEUs during 1985-86 . (7)

The development of container shipping in the Bay of Bengal has already been achieved through the introduction of feeder routes to the mainhaul liner services . The principal ports from which Bangladesh's containers are transhipped from the feeder routes to the mainhaul lines serving ports elsewhere in the world are Singapore , Colombo and Madras .

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## CHAPTER III

### STRUCTURAL DEVELOPMENT OF DEMAND

#### Commodity Structure - Foreign Trade

**Imports.** Most of Bangladesh's imports are bulk commodities with food grain, cement, fertilisers, petrol and oil accounting for around 75 % of the total tonnage. Non bulk imports amounted to 1.4 m tons in FY 85-86 of which over 90 % used Chittagong port. The non bulk import items are diverse, they are : foodstuffs, garments, raw materials, chemicals, machinery and equipment, metals and other industrial materials. (8)

Bangladesh takes almost 50 % of its imports from South East Asia and the Far East. Since 1980 the value of imports in Taka has been around 14.5 % of GDP, and 95-98 % of them arrived by sea. Table 3.1 shows Bangladesh's imports by value from FY 80-81 to FY 85-86.

**Exports.** Bangladesh exports are jute, ( which amounts for 85 % by volume of exports and 60 % by value ) jute goods, tea, leather, frozen goods, garments and others which include handicrafts. The vast majority of Bangladesh exports are carried out by sea, although the proportion has been declining in the last two to three years as garments, leather goods and frozen foods have increasingly been carried by air freight. The Taka value of exports remains reasonably stable as a proportion of GDP from FY 76-77 to FY 85-86 at around 5 to 6 %. Table 3.2 shows Bangladesh exports by value from FY 80-81 to

TABLE 3.1

BANGLADESH IMPORTS FY80-81 TO FY85-86

(Extract from Rail Container Transport Study-Bangladesh ,87)

FY	80-81	81-82	82-83	83-84	84-85	85-86
Value in million						
Taka (1)	37288	38729	45265	50874	68263	53414 (a)
Annual growth						
Rate %	22	4	17	12	34	-22
Value in million						
US \$ (2)	2293	1930	1902	2040	2629	1787
Imports as % age						
of GDP(by value)(1)	16	14.6	15.7	14.5	16.3	11.1
%age by sea ( by						
value )(1)	95	96	97	97	96	92
Bulk (ooo tonnes)(3)						
Chittagong	3838	4018	4087	4580	5520	4390
Mongla	845	868	1060	1026	2005	1453
Total	4683	4886	5147	5606	7525	5843
Bulk annual						
growth rate %	-39	4	5	9	34	-22
Non Bulk (000 tonnes)(3)						
Chittagong	1177	1129	947	1100	1309	1424
Mongla	39	51	38	62	80	108
Total	1216	1180	985	1162	1389	1532
Non Bulk annual						
growth rate %	55	-3	-17	18	20	10

(a) Estimated by factoring July 85 - May 86

Source: (1) Statistical Yearbook and monthly statistical bulletins .

(2) Calculated from the import figures using exchange rates from Bangladesh Bank Annual Report 1985-86 .

(3) Chittagong Port Authority and Port of Mongla Authority .

TABLE 3.2

BANGLADESH EXPORTS FY 80-81 TO 85-86

(Extract from Rail Container Transport Study -Bangladesh '87)

FY	80-81	81-82	82-83	83-84	84-85	85-86
Value in						
million Taka(1)	11484	12387	18016	20136	26225	27190 (a)
Annual growth						
rate %	4	8	45	12	30	4
Value in US\$ (2)	706	617	757	807	1010	910
Export as % of						
GDP at current						
market prices (3)	4.9	4.7	6.2	5.8	6.3	5.6
% by sea (by value)	98	97	97	97	94	90
(1)						
Bulk (000 tonnes)(4)						
Chittagong	282	181	134	97	45	37
Mongla	35	-	51	22	-	-
Total	317	181	185	119	45	37
Non Bulk(000 tonnes)(4)						
Chittagong	264	321	321	297	286	301
Mongla	707	708	751	667	577	762
Total	971	1029	1072	964	863	1063

(a) Estimated by factoring July 85 - May 86 by 1.08

Source: (1) Statistical Yearbook and monthly Statistical Bulletins.

(2) Calculated from the Taka export figures using exchange rates from Bangladesh Bank Annual Report 1985-86 .

(3) Calculated from Statistical Yearbook.

(4) Chittagong Port Authority and Port of Mongla Authority .

TABLE 3.3

MAIN TRADING PARTNERS

BANGLADESH EXTERNAL TRADE BY REGION FY85-86 IN MILLION TAKA (a)

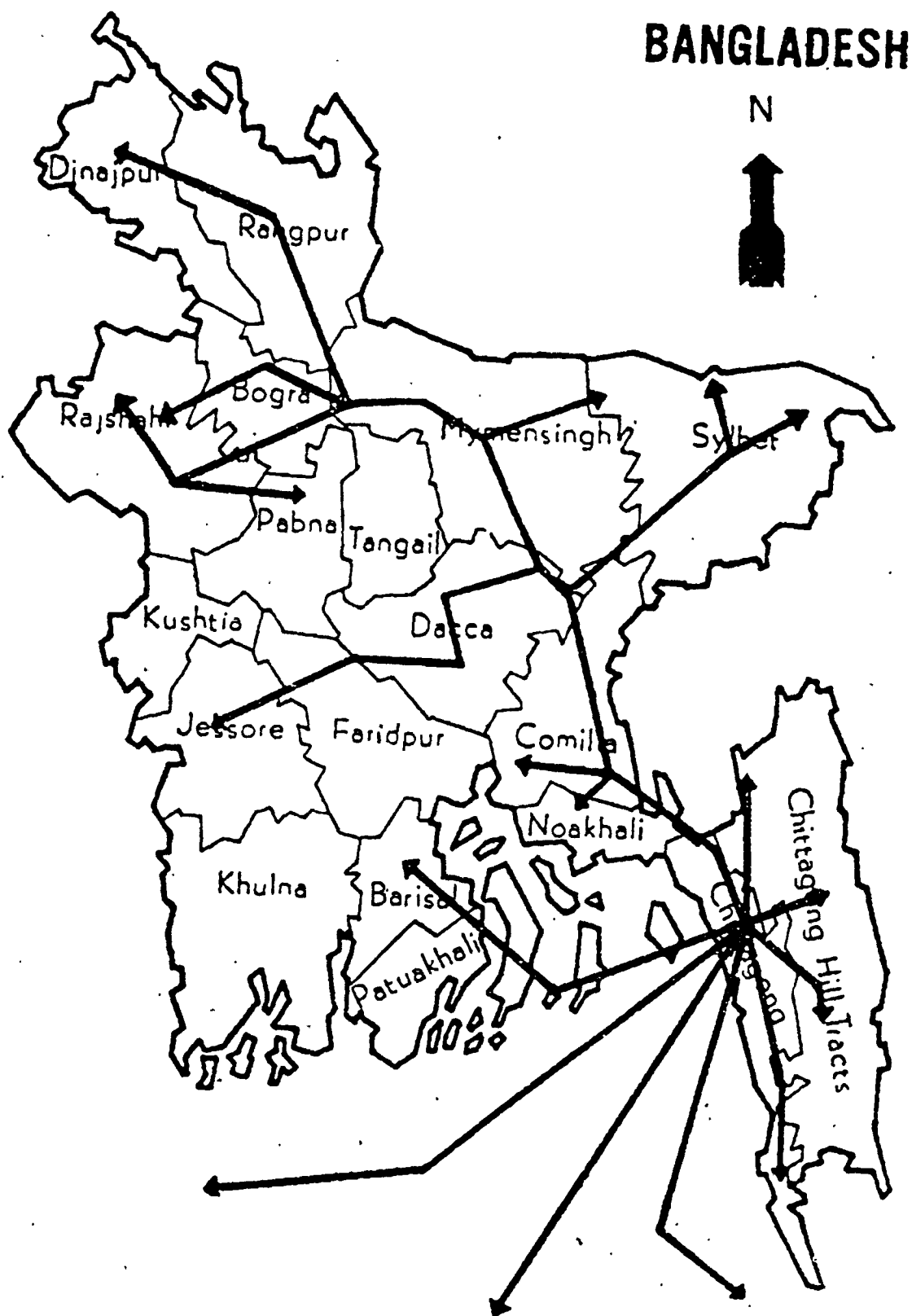
Region	Imports		Exports	
	Value	%	Value	%
Western Europe	9.2	17	5.8	21
Eastern Europe	2.4	4	1.4	5
Africa	0.1	-	1.7	6
Middle East	1.9	4	4.8	18
South East Asia				
and Far East	26.4	49	3.9	14
China	2.4	5	0.8	3
Australia	0.9	2	0.5	2
America	5.2	10	6.7	25
Pakistan	1.8	3	1.5	6
India	3.1	6	0.1	-
Total	53.4	100	27.2	100

(a) Estimated by factoring July 85 - May 86 by 1.08

Source : Monthly Statistical Bulletin , December 86 .



# IMPORT - EXPORT CARGO MOVEMENT TO AND FROM CHITTAGONG PORT



Source : CPA Yearbook '87

FIG 3.1

FY 85-86 . A map of Bangladesh showing import-export cargo movement to and from Chittagong port is at Figure 3.1.

### Main Trading Partners

The sources and destinations of Bangladesh imports and exports by value are shown in the table 3.3. Import from South East Asia and the Far East have been increasing rapidly and in FY 85-86 accounted for almost 50 % of Bangladesh imports whereas in FY 75-76 the American continent was the principal source of this import trade , contributing nearly 40 % .

The United States and Western Europe are the major destinations for Bangladesh exports as shown in Table 3.3 followed by the Middle East. The USA has become the most important as the principal destination for garments . Western Europe imports a more even share of garments , leather , tea , jute goods and frozen foods . The Middle East is an important destination for jute.

### Future Growth of Imports and Exports

Imports. Import growth in Bangladesh can only be forecast realistically on the basis of past trends , together with predictions for (macro-economic) variables such as population , GDP, investment productivity , resources and balance and terms of trade.

As we have seen earlier , growth of both bulk and non bulk imports has outstripped export growth in recent years and is currently increasing at 5% to 20% per year. With the forecast of continuing high rate of population growth , the anticipated need to import food grains to

satisfy basic needs for at least the next 5 to 10 years , and the requirement for substantial investment in infrastructure and services , it is likely that import tonnages will continue to increase at rates similar to those over the past decade . There may be some change in the composition of imports as , for example food grain imports are projected to decrease , but reduction in the items are likely to be substantiated by increase in others.

For the purpose of this study the figures propped by the consultants in the Rail Container Transport Study Bangladesh '87 will be used for the future growth of imports . Their estimates are purposefully conservative . They are:

- FY 86-87 to FY 91-92 - 6% per annum
- FY 91-92 to FY 96-97 - 5% per annum
- FY 96-97 to FY 01-04 - 4% per annum

There is however a strong argument for higher future projections , based on the fact that these growth rates represent a reduction from rates observed in the immediate past .

Exports. In general terms it is very difficult to foresee a significant increase in export tonnage, particularly through Chittagong and Mongla because of the paramount importance of jute and jute products and the poor prospects of this market . It is likely that the unit value of exports will increase as jute is replaced by higher value , jute goods , finished leather products are exported rather than hides and skins and other relatively high value exports introduced . However the increase in the exported volume of these relatively high

value items would have to be very dramatic to affect the total tonnage of exports substantially . The introduction of these higher unit value exports is in turn likely to result in further expansion of air freight , again taking trade away from the ports . Therefore it is difficult to foresee exports through Chittagong and Mongla increasing significantly beyond the level of about one million tonnes per year.

For exports also we shall use the figures for the overall growth rate for non bulk tonnage proposed by the consultants in the Rail Container Transport Study Bangladesh '87 , that is averaging no more than 2 % .

A forecast of non bulk import and export tonnages is given in Table 3.4.

### Prospects of Transit Trade

There are prospects of using Bangladesh ports as transit ports , specially Mongla for the cargo of Nepal , Bhutan and other neighbouring countries .

Some transit traffic , mostly bulk goods , has used Bangladesh ports in the past but currently there is no transit traffic to Nepal , India or Bhutan that could be identified .

We shall now discuss the prospects of transit trade with Nepal , India and Bhutan separately . A map showing the Rail Transit Routes is at Figure 3.2 .

Nepal. Nepal's import and export position has many similarities to that of Bangladesh . Imports sub-

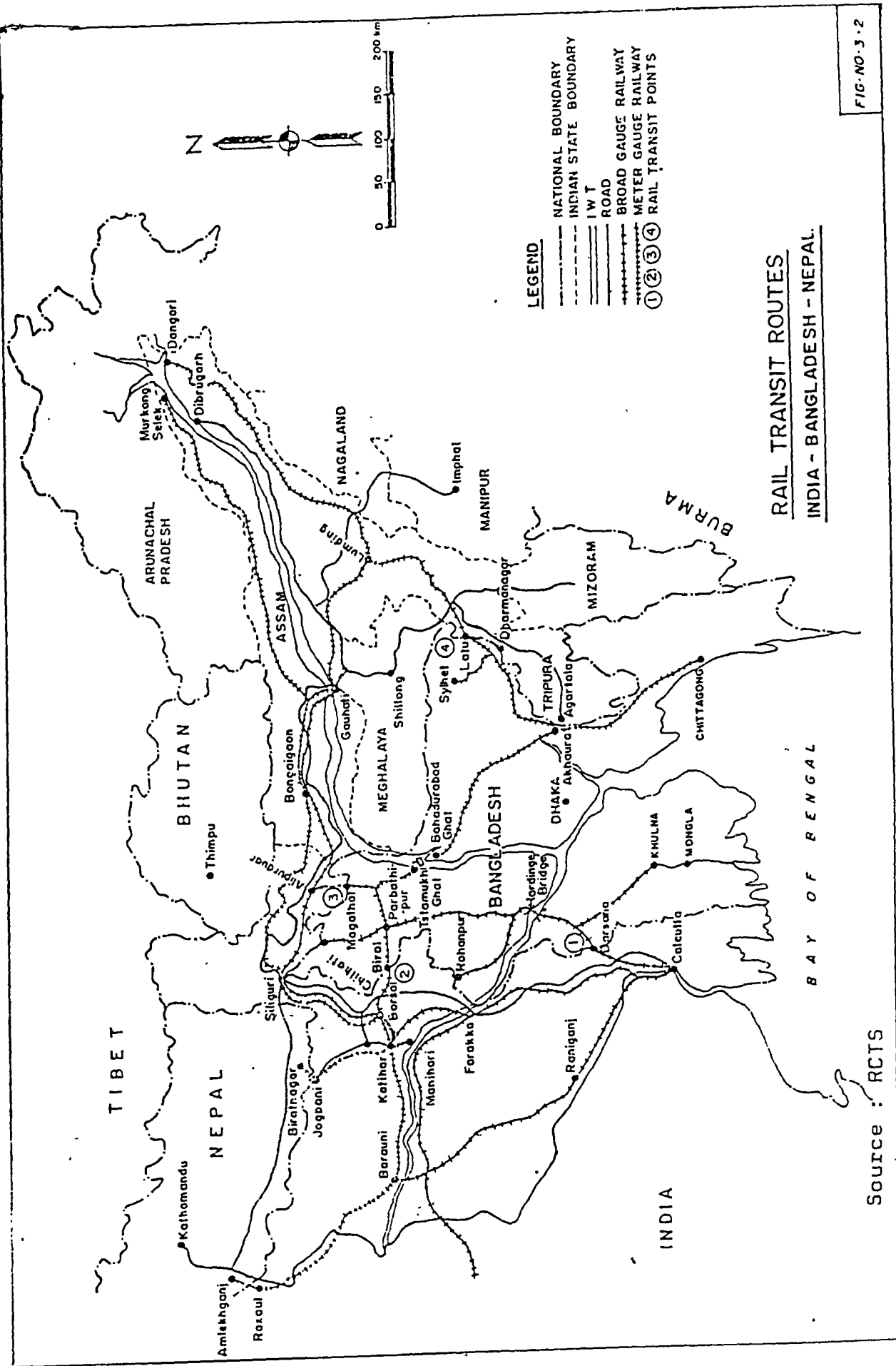
TABLE 3.4

BANGLADESH NON BULK IMPORT AND EXPORT TONNAGES (T'000s)

(With approximate annual percentage growth  
rate over period in brackets)

FY	85-86	86-87	92-93	97-98	02-03
Commodity					
Imports (Total)	1532	1639	2303	2912	3543
			(6)	(5)	(4)
Exports					
Raw Jute	417	400	373	328	251
			(-1)	(-2)	(-5)
Jute Goods	470	470	499	519	519
			(1)	(1)	(0)
Tea	25	30	35	45	56
			(2)	(5)	(5)
Garments	36	45	102	159	228
			(15)	(10)	(8)
Leather	18	18	18	18	18
			(0)	(0)	(0)
Frozen Foods	20	24	47	74	106
			(12)	(10)	(8)
Other	81	85	125	189	292
			(6)	(8)	(10)
Total	1067	1072	1199	1332	1470
			(2)	(2)	(2)

Source : Consultants analysis and estimation in Rail  
Container Transport Study Bangladesh '87 .



stantially exceed exports both in value and volume and predominant exports are jute and jute products , hides and skins . Majority of Nepal's seaborne trade is carried through Calcutta/Haldia .

In order to facilitate the transit traffic , the Nepalese and Indian governments entered into a Transit Agreement first signed in 1971 , with modifications negotiated annually mainly to cover changes in routings and custom procedures by changing circumstances .

The nearest and most obvious port to handle Nepalese maritime traffic is Calcutta and this was the port specified in the treaty . Later on however the treaty was amended and an agreement was signed in 1978 between India and Bangladesh to allow part of the traffic to be carried through Bangladesh .

The agreement was originally welcomed because

- a . It gave some freedom of choice to Nepal

- b . Once loaded onto the Metre Gauge in Chittagong no further transshipment is required between the port and Nepalese territory .

- c . Chittagong port charges are much lower than in Calcutta and Chittagong is generally perceived to be a more efficient port .

The traffic rapidly rose to 67,200 tonnes in 1980, the volume subsequently diminished until currently no Nepalese traffic is being carried . In fact the arrangement has never been a success , mostly due to the unacceptable long transit times . (It took nearly two years

for less than 50 % of the cargo landed in Chittagong in 1979 and 80 to reach Nepal ) (9)

Because the transit time was commercially unacceptable the traders reverted to importing exclusively through Calcutta . The Chittagong arrangement was a failure. The main problems with the transit agreement were :

a . Longer transit times due to lack of coordination between Indian and Bangladesh railways , shortage of wagons and motive power and procedural and customs delays .

b . Higher rail transit costs , because of the greater distance to Chittagong .

c . Inconveniences such as the Nepalese having to pay transit and port charges in Bangladesh in foreign currency and needing visas to visit Bangladesh , and

d . The disadvantages of not having the network of agents , warehouses and business associates available at Chittagong port , which has been established at Calcutta .

Following is a summary of the findings of the consultants on Nepalese transit in the " Rail Container Transport Study -Bangladesh -87 "

There is a strong political desire within Nepal for alternative routes to be made available through Bangladesh for third country transit traffic . However, there are commercial , economic and practical disadvantages in



such an arrangement as compared with existing routes through Calcutta . This particularly applies to Chittagong which is further away from Nepalese border points than Calcutta . Also between Chittagong and Nepal it is necessary to cross the Jamuna river and the Bangladesh / Indian border , both points of lengthy delay .

There is a generally held view amongst those concerned in Nepal that conditions in Calcutta port are improving . It is also felt that truck transport is much more efficient than by rail .

In the present circumstances the commercial sector in Nepal has , in theory a choice between using rail via Chittagong and truck ( or rail ) through Calcutta . In practice the advantages of Calcutta are overwhelming and Chittagong is not seen as a viable alternative to Calcutta . There is little prospect of this situation changing in the future.

More consideration is currently being given to the prospects for using Mongla as an alternative transit port for Nepal and a committee has been established to promote this possibility on behalf of Bangladesh . The Port of Mongla Authority and some private traders have been lobbying the Bangladesh government to obtain the Indian government's approval for rail transit traffic to cross the border at Rohanpur and for Benapole to be opened to road transport traffic .

The rail distance from Mongla to Jogbani ( Nepal/ India border ) is 588 kms , compared with 963 kms from Chittagong , However , the former necessitates transshipment from Broad Gauge to metre gauge at Parbatipur .

Rail through Mongla may not be regarded as an attractive alternative to truck via Calcutta . Road transport from Mongla would be more attractive but may be more politically sensitive . Inland water transport has some advantages over both road and rail .

If the rail route via Chittagong has any potential for carrying Nepalese transit traffic , it is for bulk rather than non bulk or containerisable traffic . This is for all the usual reasons favouring rail transport of bulk cargoes , such as the large size of consignments and the relative insensitivity to transit time .

Rail movement of transit traffic in containers would require the provisions of dedicated resources and use of unit trains . These would only be provided if there were a commitment to ensure movement of adequate volumes of containers regularly . Bulk traffic on the other hand would make use of conventional services.

**Bangladesh Nepal Bilateral Traffic.** Bangladesh exports fertiliser and some bitumen , but little else to Nepal while Nepal's exports to Bangladesh have come down to almost zero . Bangladesh exports amounted to only about US\$ 5 million in 85-86 . There were no imports from Nepal in 1985-86 .

The fertiliser exported to Nepal is mainly urea from from Ghorashal and Tripple Super Phosphate (TSP) from Chittagong . This traffic is expected to increase in future but prospects for other bilateral trade are very limited . There is little containerised traffic potential.

(10)

India. Two ICDs are proposed to be set up in FY 88-9 in North Eastern India at New Jalpaiguri and Gauhati . A temporary ICD is already in operation in Gauhati.

Annual containerisable tonnage forecasts for these two ICDs in thousand TEUs are :

	Import		Export	Total
	Loaded	Empty	Loaded	
Gauhati	1.8	8.45	10.25	20.5
New Jalpaiguri	-	1.9	1.9	3.8

Source : Transmark/RITES

The movement potential to and from Gauhati is considerable , the average daily TEUs forecasts requiring one train per day . From July to December the requirements would be about 70 % above the average annual demand .

From the figures above it can be seen that demand is almost entirely in the export direction , this means importing substantial numbers of empty containers . It has previously been assumed that these could be moved from Calcutta .

The potential attraction of carrying this traffic through Bangladesh is not just the volume but also the directional pattern . Chittagong currently exports considerable numbers of empty containers and this will increase . A Dhaka ICD would also have a considerable imbalance in favour of imports , even after allowing for some empties being sent for loading elsewhere in the

country ( Srimongal ). There would be advantages in despatching the surplus empty containers from Dhaka for stuffing at Gauhati rather than returning them empty to Chittagong .

The economics of moving containers to and from Gauhati through Chittagong port therefore appears attractive . The situation for New Jalpaiguri is less so .

The distance to Mongla is little shorter than that to Calcutta , traffic levels are lower and the BG border crossing would have to be reopened to allow rail movement into Bangladesh . A benefit might be that enough empties would be generated from imports into North Bengal to feed New Jalpaiguri without the need to bring empty containers from Calcutta , but this is unlikely. (11)

Bhutan. Bangladesh and Bhutan signed a bilateral trade agreement in 1980 but no significant movement of goods has subsequently taken place . At present there is little indication or interest in , potential container traffic between these two countries .

### Container Traffic Forecasts

The total volume of containers through the ports ie aggregate demand , estimated by the consultants in the Rail Container Transport Study Bangladesh '87 is given in the following paragraphs .

Container traffic is forecast to grow from 56000 TEUs pa to 154000 , 252000 and 360000 TEUs pa by FY92-3 , FY97-8 , FY02-3 respectively . Between 30 and 50% of

export TEUs are expected to be loaded boxes . The imbalance between imports and exports is expected to widen slightly as container penetration of imports reaches the same level as exports . Dhaka is expected to account for between 50 and 55% of imports and exports in the future.

It is assumed that :

a . The extent of containerisation into and out of Bangladesh would be dictated by other countries .

b . Aggregate port throughputs would be predominantly determined by the performance of the Bangladesh economy .

c . The distribution of traffic between ports would be determined by many factors other than inland transport costs .

d . The locational distribution of importers and exporters within Bangladesh would not respond readily to changes in transport costs because of many other factors (locations of raw materials , agents, banks , etc) involved in any decision to relocate.

In FY86-7 container penetration of non bulk imports was estimated at 18-19% . Tonnage per loaded TEU is continuing to fall , largely as a result of increasing proportions of 40 foot boxes . From a peak of 13.8 tons the average weight per TEU is now 11.4 tons . The imbalance between imports and exports and between ports results in substantial handling and storage of empty containers . Container dwell times , ie , the time a container stays in a port (or ICD) is currently estimated at between 20 to 25 days for imports .

On analysis of the import and export container traffic which included delivery addresses , modal split , port dwell times , use of agents , transport costs , onward distribution requirements and other relevant information , it was established by the consultants that almost 70% of import containers examined contained goods for Dhaka . Of these 75% were for delivery in Metropolitan Dhaka . The pattern is likely to remain the same . Jute will continue to dominate exports but growth is likely to come mostly from garments and frozen food .

From the forecasts by commodity in Table 3.4 it can be seen that the rate of containerisation of raw jute , jute goods and "other" are critical to the forecasts of containerised tonnages .

At Table 3.5 is the forecast of container penetration of Bangladesh non bulk imports and exports , ie , the percentage of the available containerisable tonnage actually transported in containers .

The forecast of container tonnage for Bangladesh imports and exports are given in Table 3.6 . This has been arrived at by multiplying the non bulk tonnages in Table 3.4 by the market penetration in Table 3.5 .

### **Port Throughputs**

a . **Allocation.** Chittagong share of containerised imports is assumed to decrease gradually and is forecast as : 97% for FY86-7 , 94% for FY92-3 , 89% for FY97-8 and 84% for FY02-3 , and for exports

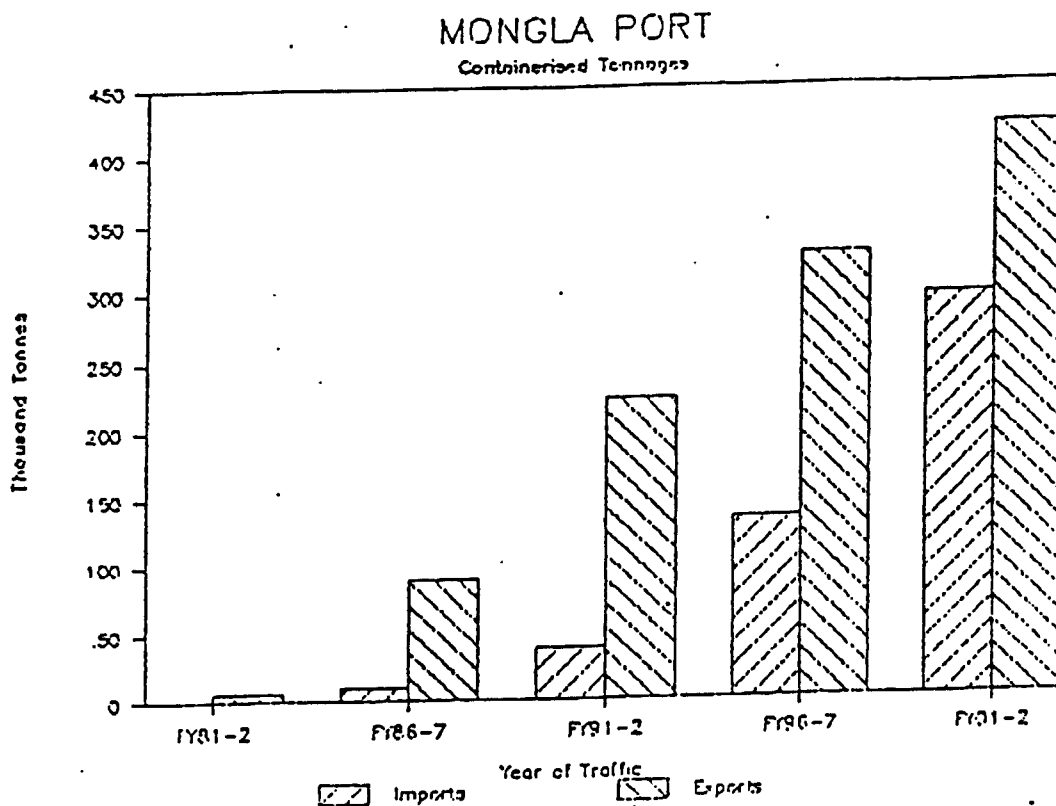
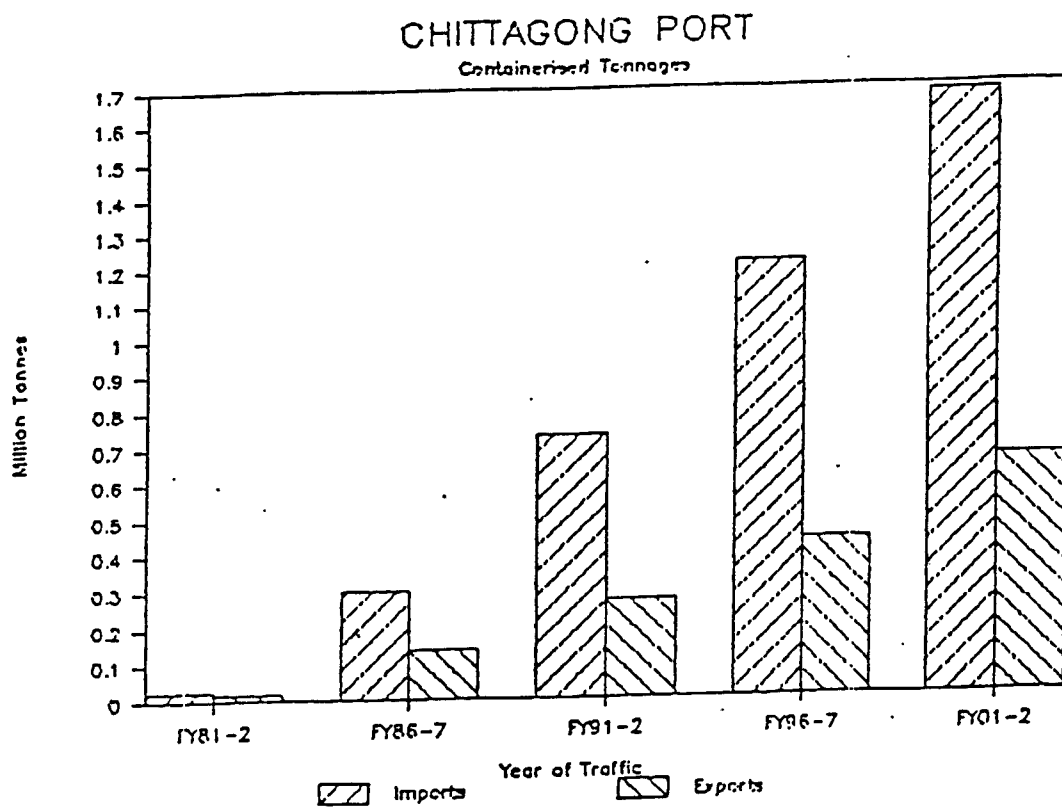
**TABLE 3.5**  
**FORECAST CONTAINER PENETRATION OF BANGLADESH**  
**NON BULK IMPORTS AND EXPORTS (PERCENT)**

	FY	86-7	92-3	97-8	02-3
Commodity					
<b>Imports (Total)</b>		<b>19</b>	<b>38</b>	<b>50</b>	<b>60</b>
<b>Exports</b>					
Raw Jute		5	17	28	43
Jute Goods		18	43	58	73
Tea		60	72	82	92
Leather		85	91	96	100
Frozen Foods		100	100	100	100
Garments		95	100	100	100
Other		30	42	49	56
<b>Total Exports</b>		<b>21</b>	<b>43</b>	<b>58</b>	<b>72</b>

**TABLE 3.6**  
**FORECAST CONTAINER TONNAGE FOR BANGLADESH**  
**IMPORTS AND EXPORTS (000 TONNES)**

	FY	86-7	92-3	97-8	02-3
Commodity					
<b>Imports (Total)</b>		<b>311</b>	<b>875</b>	<b>1456</b>	<b>2126</b>
<b>Exports</b>					
Raw Jute		20	63	92	108
Jute Goods		85	215	301	379
Tea		18	25	37	52
Leather		15	16	17	18
Frozen Foods		24	47	74	106
Garments		43	102	159	228
Other		26	52	93	164
<b>Total</b>		<b>230</b>	<b>520</b>	<b>774</b>	<b>1055</b>

Source : Consultants analysis and estimates in RCTS .



Source : RCTS

FIG NO 3.3



for FY86-7 to FY02-3 -2% for raw jute , 28% for jute goods and 93% for tea , leather ,frozen foods, garments and other goods . The resulting forecast growth of containerised import and export tonnage through the two ports is shown in Figure 3.3 . The increasing percentage share of imports through Chittagong and Mongla is clearly shown .

b . Tonnages Per Loaded TEU. In forecasting future changes in container tonnages use has been made of the recent trends ; an increase in the proportion of 40ft containers from 39% of import TEU and 50%of export TEU in FY86-7 to 56%and 60% respectively in FY02-3 . There is an associated reduction in the average tonnage per TEU, because of the smaller average tonnage per TEU for 40ft compared with 20ft containers , from 12.4 tonnes for imports and 9.9 tonnes for exports in FY86-7 to 10.9 tonnes and 9.9 tonnes respectively in FY02-3 proportion of 40ft containers is likely to continue increasing worldwide . This is assumed to apply to Bangladesh also .

c . FCL and LCL. It is assumed that the FCL/ LCL proportions for imports would also be applicable to exports for both the ports . In future the FCL proportion would increase , consistent with worldwide trends . The share of FCL is assumed to rise from 66% in FY86-7 to 75% in FY 02-3 .

Estimated port throughputs for Chittagong in terms of TEU are summarised in Table 3.7 .

TABLE 3.7

CHITTAGONG - FORECAST OF CONTAINER

IMPORTS AND EXPORT (TEU '000S)

	FY	86-7	92-3	97-8	02-3
Commodity					
Imports					
FCL		16	49	85	123
LCL		8	20	28	41
Total Loaded TEU		24	69	113	164
Empties		4	8	13	16
Total Import TEU		28	77	126	180
Exports					
FCL		9	21	35	50
LCL		5	9	11	17
Total Loaded TEU		14	30	46	67
Empties		14	47	80	113
Total Export TEU		28	77	126	180

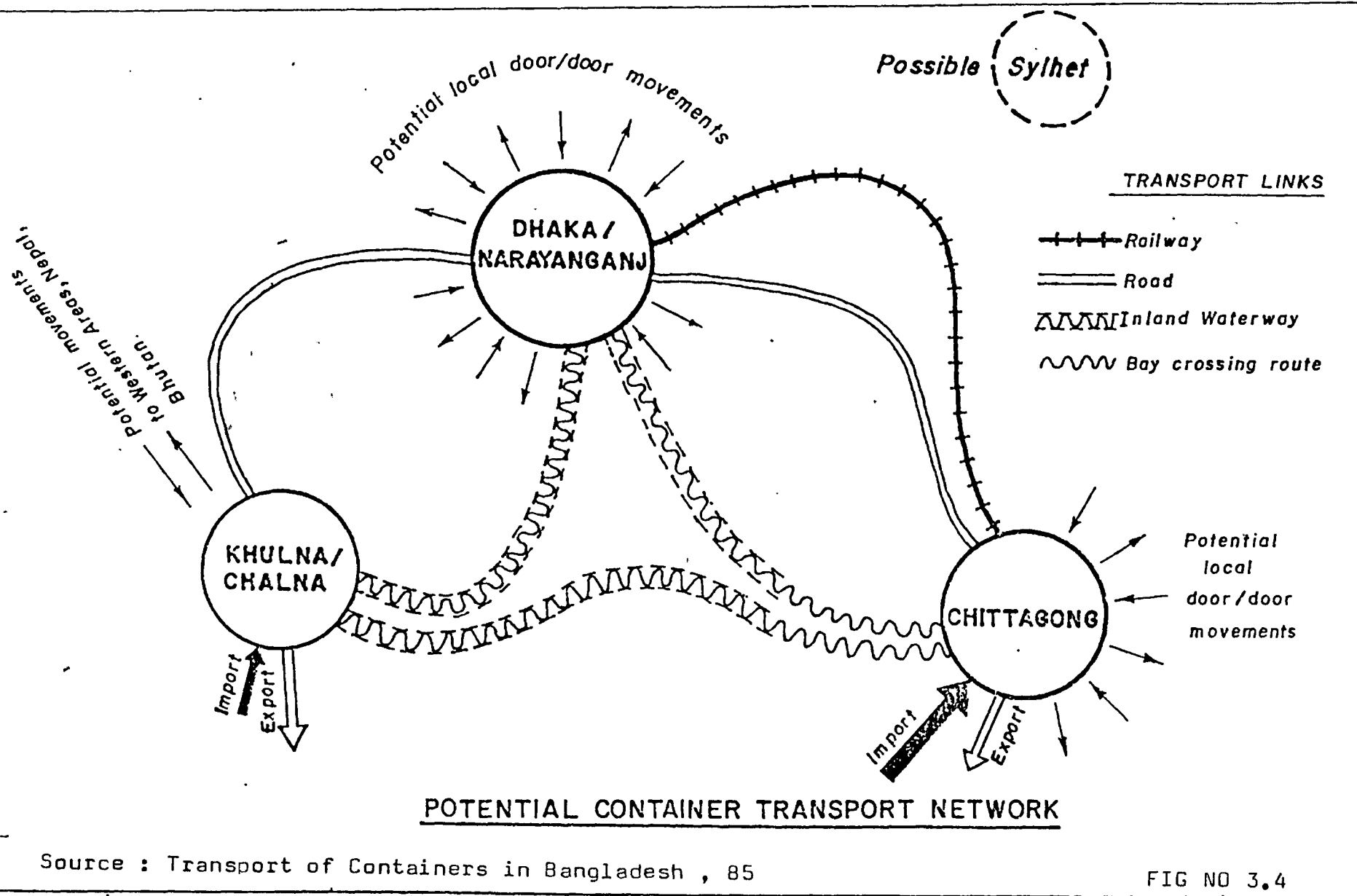
Source: Consultants analysis and estimates in RCTS .

# Advantages and disadvantages of rail, road and inland waterway transport

Rail	Road Advantages	Inland Waterways
<ul style="list-style-type: none"> <li>- Comparatively low energy per ton/km</li> <li>- Convenient transport of low value consignments (bulk materials, heavy volumes)</li> <li>- Low cost per unit carried on long distance</li> <li>- Permanent service all over the year</li> <li>- Very high level of safety</li> <li>- Possibility of programming transport processes</li> </ul>	<ul style="list-style-type: none"> <li>- Relatively small initial capital investment</li> <li>- Flexibility of capacity and services and of scheduling departures/arrivals</li> <li>- On short distances: speed of service and low cost per unit carried</li> <li>- Low terminal costs</li> <li>- Door-to-door services</li> <li>- High reliability, security and availability</li> </ul>	<ul style="list-style-type: none"> <li>- Transport of large volume of (bulk) cargo at low cost</li> <li>- Low energy consumption per unit</li> <li>- Very high safety</li> </ul>
Disadvantages		
<ul style="list-style-type: none"> <li>- Big initial capital investment</li> <li>- Capacity inflexibility</li> <li>- Slow transport facilities on short distances</li> <li>- Expensive terminal facilities</li> <li>- High cost of transshipments</li> <li>- Low door-to-door capability</li> </ul>	<ul style="list-style-type: none"> <li>- Limited capacity for moving heavy volumes of bulk materials</li> <li>- High cost for very long hauls</li> <li>- Interruptions due to vehicle breakdowns or weather conditions</li> <li>- Low energy efficiency</li> </ul>	<ul style="list-style-type: none"> <li>- Negative image (slow and unreliable)</li> <li>- Restricted to seaport transport (concentration of large number of containers necessary)</li> <li>- Minimum of containers required to run a regular service</li> <li>- Very low door-to-door capability</li> </ul>

Table : 3.8

Source : Keppel R , Port Management Textbook-Containerisation



### Rail, Road or IWT ?

The key determinants of a choice between the three modes for inland transport of containers are the costs of transportation and the quality of service . A comparison of the advantages and disadvantages of rail , road and inland waterway is given in Table 3.8 . (12)

Major factors affecting competitive transport costs and service quality are the pace of improvements to the roads between Dhaka and the two ports and replacement of ferry services by bridges and any investment in container handling facilities for IWT . Very important is the growth in availability of larger 3 and 4 axle trucks , capable of carrying containers .

Transport routes to be considered are those which could have a direct role to play in transportation of containerisable freight between Dhaka and the ports of Chittagong and Mongla . These cover rail , road and IWT. Each route suffers from constraints which need to be alleviated .

Till in the recent past virtually all containerisable traffic was carried by road . Between Dhaka and Chittagong - IWT currently lacks container carrying capacity , therefore there is no competition with road or rail .

Nearly all containers are unstuffed at Chittagong and transported inland by road in break bulk form . The proportion carried by rail is low and for IWT appears to be negligible . The main reasons identified for choosing road were speed and reliability .

Traffic volumes and route distances greatly influence rail competitiveness . Also important are the relative levels of efficiency of the various modes . Road is generally quicker than other modes for freight , except air , and rail quicker than water . On the other hand the lowest cost per ton/km or unit of capacity is generally achieved by water followed by rail and road . However rail and water usually require investment in terminal facilities and sometimes collection or delivery of goods by road .

The consultants in the RCTS have identified adequate traffic to support rail container services in the Chittagong - Dhaka sector with an ICD at Dhaka .

If rail is to enter the container traffic market this will have to be by offering an attractive alternative to road , particularly in terms of quality of service.

According to the main conclusions arising from the assessment of through costs by the consultants in the RCTS :

- a. Rail may be reasonably competitive compared with road for LCL on the basis of direct transport costs.
- b. Rail may be less competitive than road for FCL . It will take some years for road to offer a fully comparable FCL service to a large share of traffic.
- c. Since rail would offer the only regular service for through transport of loaded 40' containers -

calculations on a per TEU basis may understate the overall competitiveness compared with road .

A potential transport network for Bangladesh is shown at Figure 3.4 . (13)

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- (9) As cited in (8) above .
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- (12) Keppel R , Inland Transport Network , in Port Management Textbook - Containerisation . Institute of Shipping Economics and Logistics , Bremen'85.
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## CHAPTER IV

### STRUCTURAL DEVELOPMENT OF SUPPLY

#### Existing Port Facilities

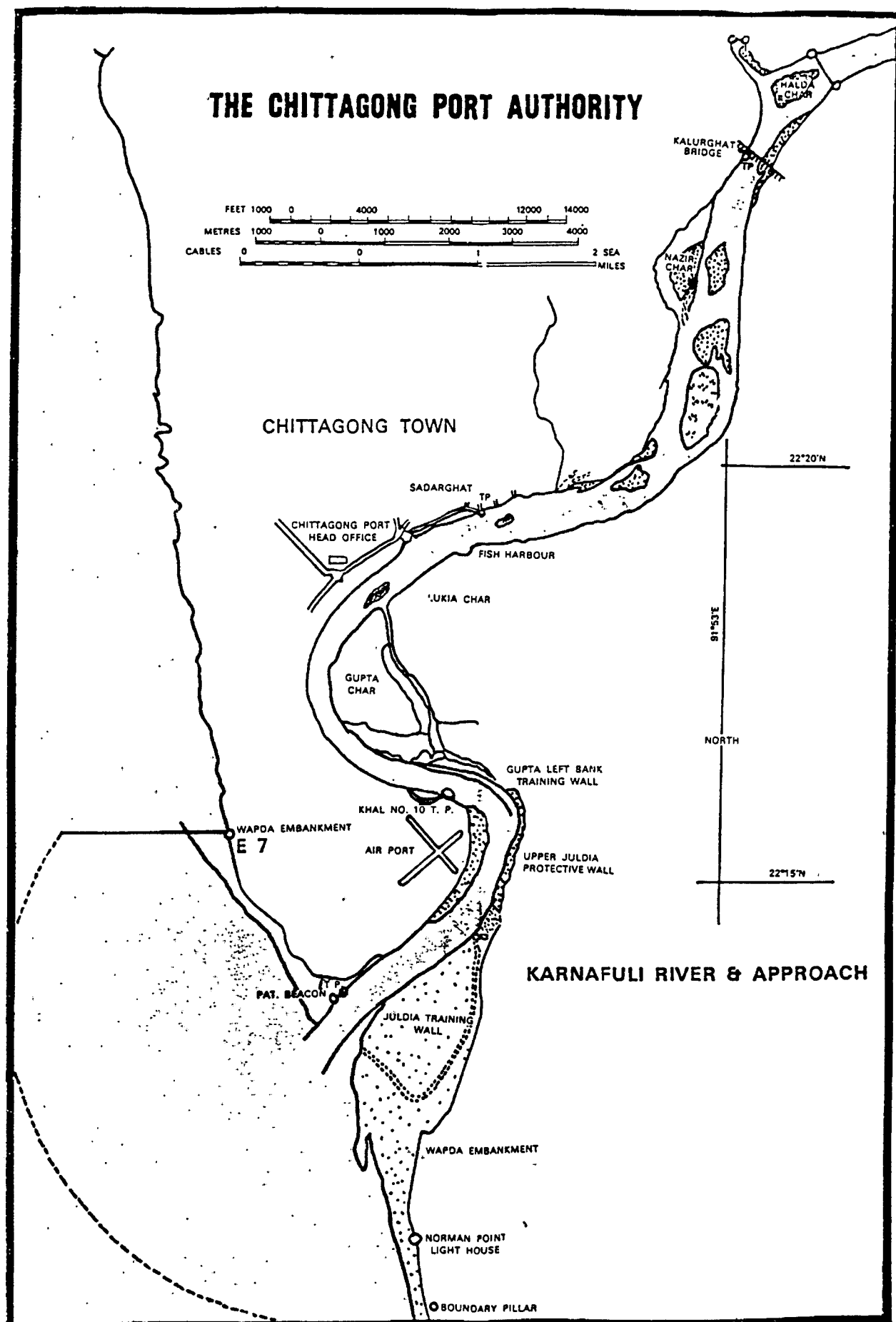
Port of Chittagong. The main port situated on the right bank of Karnaphuli river comprises 13 general cargo berths , mostly backed by warehouses , along the river with another 4 berths further west beyond the two multipurpose berths , now being constructed. Beyond these last 4 berths bulk discharge facilities exist for bulk traffic . These follow the river and road leading to Chittagong airport. A map showing the Karnaphuli river and its approach is at Figure 4.1 and a general view of the Port of Chittagong is at Figure 4.2 .

Depth at jetty berths ranges from 7.01m to 9.14m and depth at moorings ranges from 6.24m to 9.19m and above . The width of the navigational channel (5.49m contour) varies from place to place. A minimum of 250m channel width is maintained . For manoeuvring in the Karnaphuli river the length (LOA) carrying dry cargo and tankers with oil is restricted to 186m (610ft). The datum depth of the Outer Bar is 5m approximately . (14)

Chittagong is connected by MG railway and road , currently involving two ferry crossings with Dhaka. Water craft or barges to and from Dhaka cross the edge of the Bay of Bengal to reach Chittagong .

Rail access is available to all berths and backup storage areas . There are in all three accesses and two







marshalling yards . One of the rail accesses , with a connection to the rail marshalling yard , runs behind the site of the MPB and serves berths 14 to 17 and the bulk facilities . This line will eventually serve the rail terminal at the MPB also. (15)

Cargo and Container Handling Facilities. General cargo containers and some bulk traffic mostly bagged grain or cement are handled at general cargo berths 1-13 in the main port area . Light conventional cranes are provided on most berths but discharge and loading of containers are carried out by ships gear.

Purpose built road tugs and trailers are used to convey containers to and from the quays and storage areas . Large areas of the port have been given over to container storage causing congestion . Containers are stored loaded , awaiting customs , and empty , waiting outshipment . Some of the storage areas are well surfaced and orderly and others are improvised . Most FCL and LCL containers are stripped or stuffed in the open , also customs examination takes place in the open .

Container yards and storage facilities available are as follows:

	Sq m
* Area of existing Interim Container yard	- 67215
* General cargo dumps being used for container handling	- 11373
* Space being used for storing empty containers-	20000
* General cargo dumps temporarily used for container stuffing and stripping and storage	- 17600
* Yards under construction	- 14000
In addition , more space was to be brought under the	

Interim Container Yard during 87-88 .

Plugging facilities for 30 refer containers have been made available for public use in the Interim Container Yard .

An open type hanger adjacent to the container freight station ie "N" shed , facing the yard with 32ft height, 90ft length and 45ft breadth is also available for all weather stuffing and stripping of containers round the clock .

"M" shed and "N"shed with 8084.10sqm area each have been converted into CFS . (Source: CPA Yearbook '87)

Various port sheds at the west of the port area close to berths 12 and 13 are used for import LCL and export FCL traffic . Import FCL are usually unloaded direct to road truck , after customs clearance . Present arrangements are obviously slow , expensive and cause damage and loss of goods .

The port does have a fleet of modern Valmet front loaders for container handling . (Source: RCTS)

CPA has already received 2 Forklifts (FLT's) of 42 tonnes capacity , 8 FLT's of 25 tonnes capacity , 3 FLT's of 16 tonnes capacity , 12 terminal tractors , 4 trailers of 40ft length and 12 trailers of 20ft length , 6 Roll Trailers for stuffing and stripping . 10 Pallet trucks . Goose neck 2 nos and Parking Stands 2 nos under the Finnish Grant . In addition 1 no 42 tonne FLT and 4 nos 40ft long terminal trailers were expected to be received by the end of '87 . (Source : CPA Yearbook '87) .

Multipurpose Berth. The scope of the multipurpose berth project engulfs the construction of 2 wharves of 450m in length which have been completed and are designed to carry gantry cranes and heavy container handling equipment . The backup facilities which are yet to be completed will include development of about 450 acres of land into paved storage area , Container Freight Station (CFS) , office building , garage and workshops , customs fencing , services and utilities etc. The project is expected to be completed by 1991 and would enable to handle a total throughput of more than 90000 TEUs per year. At the same time the berths can be used for other cargo too . However , it is likely that some of the port container throughput will continue to arrive at other berths , on general purpose vessels , even after this new berth is in operation. (16)

Rail Facilities. Bangladesh Railway operates the port rail system with its own locomotives. Conventional wagons are loaded on or around the various berths and warehouses . They are distributed from a number of small sorting yards .

Containers are loaded and discharged to and from rail wagons at a small yard close to the main port entrance . Generally front loaders are used but a rail mounted gantry crane exists and is expected to be refurbished for container handling. (17)

### Mongla Port

The port is situated at the confluence of the river Pussur 80kms up from the Bay and Mongla Nullah and occupies a strategic position in the topography of Bangladesh . The entire western part consisting of most of the districts of Bangladesh in its hinterland .

The one and only bar at the entrance of Pussur River has a minimum datum depth of 17ft . This is a limiting factor affecting the draft of ships entering and leaving Mongla Port .

There are 5 newly constructed berthing jetties of 600ft each with 28ft depth of water at the jetty front . Besides there are 12 swinging mooring buoys where the vessels are made fast with their own cables , 19 more ships can be safely anchored within 4 miles working range. The depths vary between 45-19ft at datum .

There are 4 transit sheds of 52800sqft and 7500 tons capacity each (3 completed) and 2 warehouses of 105600sqft and 15000 tons capacity each . Besides there is open stack yard for containers . Construction of other ancillary facilities is in progress .

For container handling there are two prime movers , two 40ft trailers, Eight 20ft trailers, one 25 ton fork - lift and one 30.5 ton forklift .

Cargo that cannot be handled in the berths is discharged or loaded overside between ships and barges at the Mongla Anchorage . A high quality road now exists to Khulna but a congested ferry across the Rupsa river must

be used to get to the port . The nearest suitable rail facilities are at Khulna , across the Rupsa river .

With the completion of Khulna-Mongla highway , the port has been connected with the rest of the country by the land route. Ro Ro ferry has been provided at the Rupsa river Ferry crossing . (18) & (19)

### Existing Internal Transport Facilities

(20)

Roads and Road Transport The development of roads in Bangladesh had been rather slow until the beginning of 2nd Five Year Plan in mid 1980. Since then , increased emphasis has been given to the development of roads.

The road transport sector plays a most important role in the overall growth of economy in Bangladesh. It contributes about 4% of the countries GDP. Road transport presently carries about 63% of freight and 40% of passenger traffic .

Road Network . There are at present 10914kms of roads under the control of the Roads and Highways Department . Of these 2820kms are national highways and they are all paved (was only 1375kms in 1980). National highways are mostly single carriageway two lane roads generally having a pavement width between 5.5m to 6.7m. Alignment of the roads is very poor at many locations . The roads pass through a number of small towns and villages , and activities such as weekly markets , encroach on the highways causing obstructions to the smooth movement of traffic . Some of the national highways are plan-

ned to be reconstructed with foreign assistance . These projects were expected to be taken up by the end of '87 .

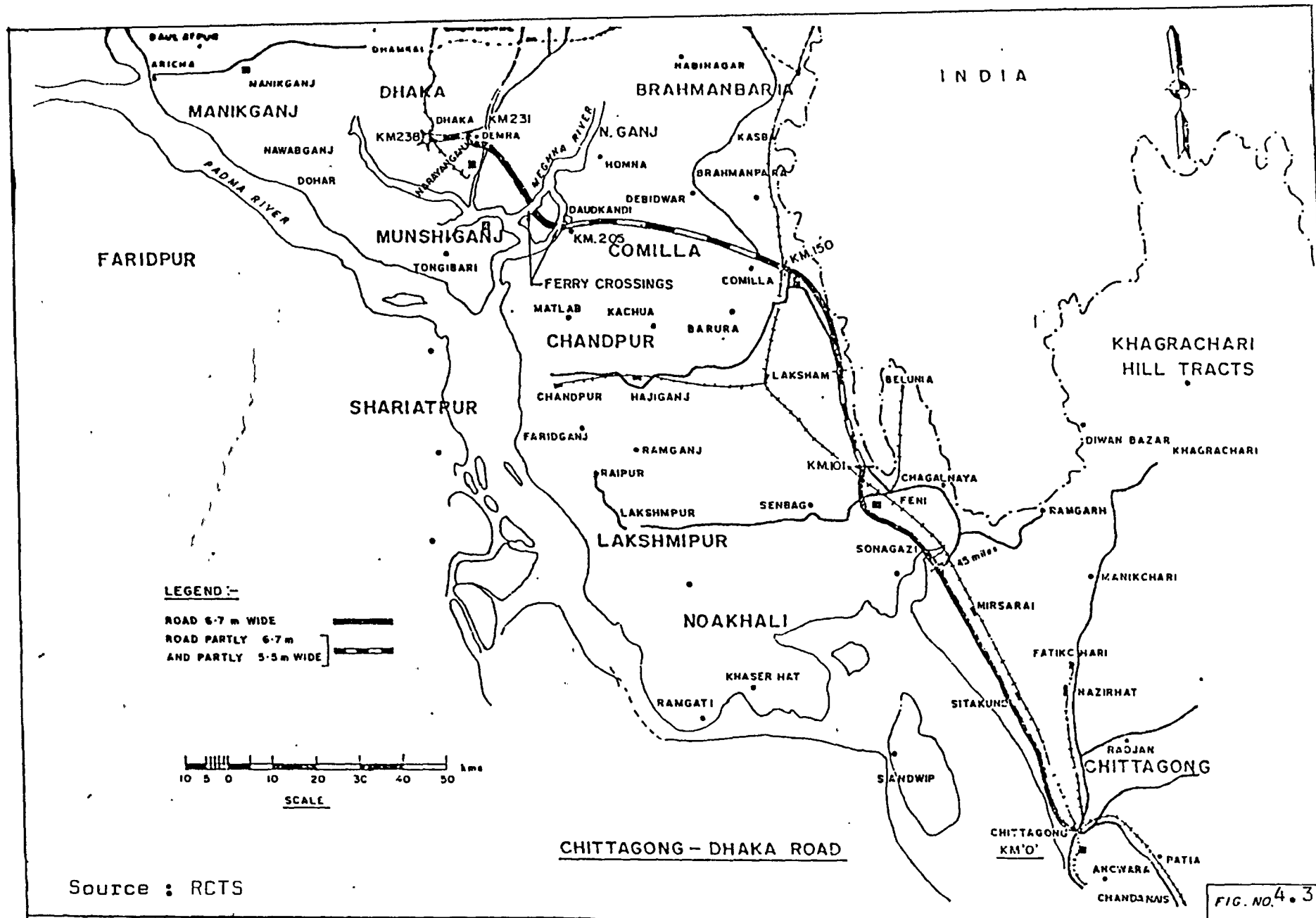
As the country is riverine , bridges and culverts feature prominently on the road network . At present there are 2389 bridges having a total length of 69900m and 7439 culverts having a length of 3110m. Many of the older bridges and culverts are inadequate to support the existing and projected vehicle loads and form the weakest link in the road network . Besides , a number of major rivers in the country have not been bridged so far and have to be crossed in ferries which not only slows down the traffic but also places restriction on the type of vehicles .

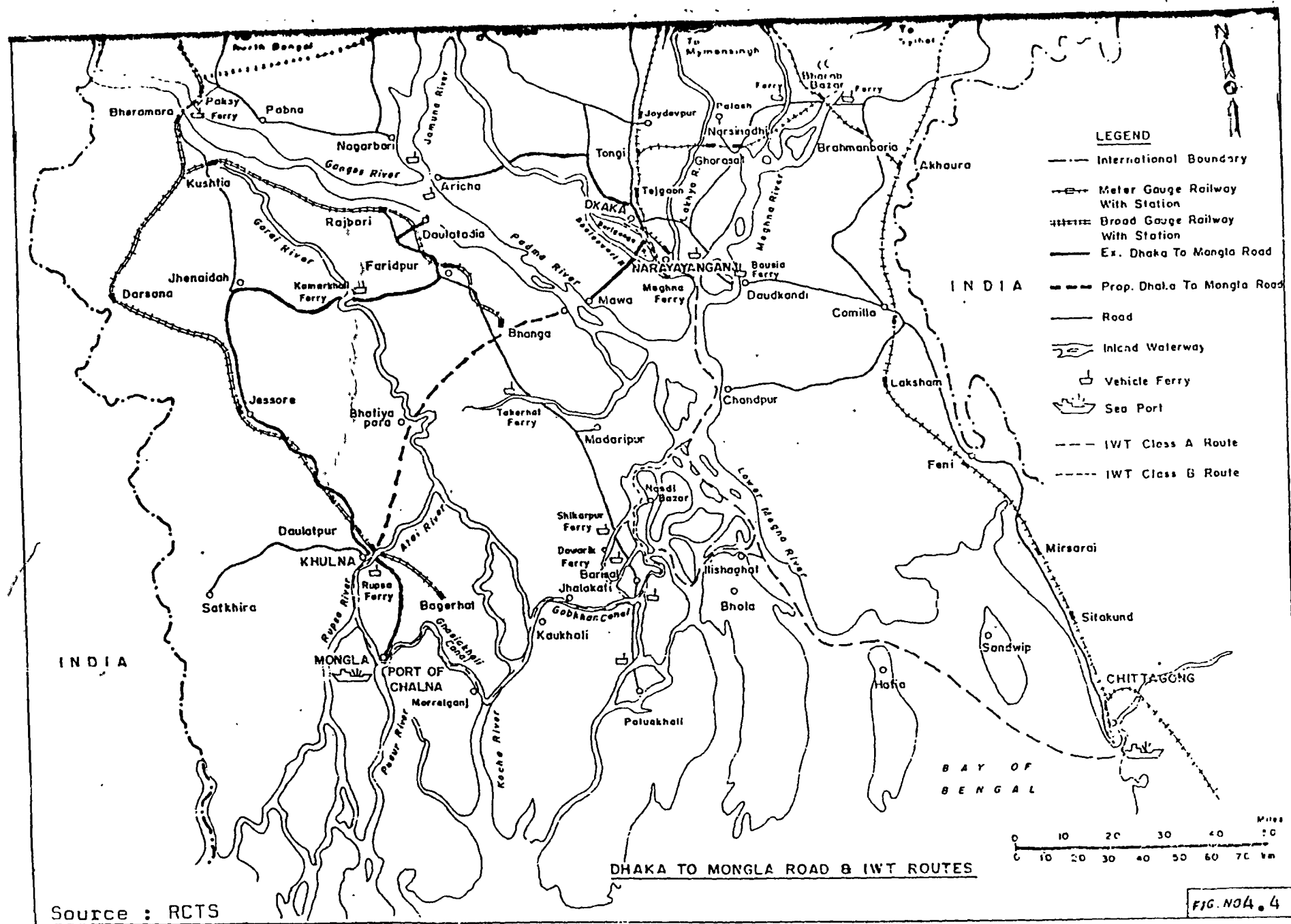
Since 1980 the programme of rehabilitation of old bridges and construction of new bridges to replace the ferries has received considerable impetus . 12 major bridges having a length of 1891m have already been completed and 17 more with a length 4765m are under construction with substantial foreign assistance .

Even with the construction of the above bridges , there still exist as many as 33 ferry crossings . Twelve of these which are on important trunk roads such as Dhaka -Chittagong , Khulna-Mongla , Dhaka-Mawa and Dhaka-Sylhet are being planned for replacement with bridges in the near future .

The axle load effects of road vehicles carrying containers are likely to be significantly greater than the average loads of current commercial vehicle traffic in Bangladesh . The impact of containerisation on the road system would be - increase in pavement maintenance







and upgrading of the roads and the design of new facilities to handle container traffic.

Most important routes relevant to this study are the Dhaka-Chittagong highway , Dhaka-Sylhet road , direct road from Dhaka to Mongla port . Projects are in hand to improve these routes . However the consultants view is that it is unlikely that the full length of road from Chittagong to Dhaka will have been upgraded to a sufficient standard for the efficient transport of containers by road much before the year 2000. The Dhaka-Chittagong highway route and characteristics by route section are shown in Figure 4.3 . The Dhaka to Mongla road and IWT routes are shown in Figure 4.4 .

It has been recommended by the consultants in RCTS that roads which will be used by trucks/trailers loaded with containers , should in the interest of safety be widened to at least 7.3m (24ft) wherever possible , this being the common international standard.

**Vehicles.** In the Asian Development Bank (ADB) Road Sector Development Studies , the consultants , Kamp-sax, estimated the Bangladesh motor vehicle fleet in 1986, including motorcycles at 153000. The truck fleet was estimated at 16500 vehicles. The consultants and the Roads and Highways Department estimated that the truck fleet would be 19000-20000 in 1990 and 25000-26000 in 1995.

In addition to the motorised vehicle fleet there are enormous number of non motorised conveyances . Cycle-rickshaws , in particular , although predominantly found

in urban areas . These add considerably to the difficulties of motorised transport on the national road network.

Trucks are two axle having a typical loading capacity of six to seven and a half tons . Three axle rigid vehicles are occasionally seen but articulated vehicles are virtually nonexistent , apparently due to the constraint of ferry crossings .

The axle loads will vary both with the type of vehicles and the loads in the containers . Following 4 types of typical vehicles are considered :

a . Two axle rigid lorry - Currently being used to carry containers in Bangladesh . These are not designed to carry containers and are unsuitable for this purpose . Such vehicles would continue to be used for sometime though .

b . Three axle rigid lorry - Not common in Bangladesh but are the most frequently used type of heavy commercial non articulated truck elsewhere .

c . Four axle articulated tractor trailer - These are the type of vehicle most commonly used for carrying containers and some are already in use by shipping lines in Chittagong .

d . Five axle articulated tractor trailer - These can carry heavier loads with less axle weight than the 4 axle type . It is presumed that they may eventually form a proportion of the container carrying fleet .

Opinions differ as to how soon larger trucks will be introduced but it is clear that their introduction will continue to be restricted by the regulations in the Vehicle Ordinance , the geometry of roads and the size of ferries . The ADB Road Sector Development Studies , Final Report concluded that the average size would not increase noticeably within the next ten years .

The public sector Bangladesh Road Transport Corporation (BRTC) plays only a minor role in truck transport in Bangladesh . In May '86 it had a total fleet of 256 and is estimated that BRTC takes about 5.6% of traffic in the principal routes in Bangladesh .

### Inland Water Transport

(21) & (22)

Waterways. The principal waterways - administered by Bangladesh Inland Waterways Transport Authority (BIWTA)- used for transportation are the natural routes formed by the river systems and are classified as regular or seasonal depending on the water discharge . For this study , regular routes having controlled depths of at least 3.7m (12ft) described as Class A or those exceeding 1.8m (6ft) are Class B , are of prime importance.

For transportation of containers the following routes are of most relevance :

From	To	Class	Distance kms/miles
a. Chittagong	Dhaka	A	307 / 191
b. Chittagong	Khulna	A	417 / 259
c. Mongla	Dhaka	A	338 / 210
d. Mongla	Dhaka	A&B	303 / 188

e. Mongla	Khulna	A	48 / 30
f. Dhaka	Narayanganj	B	18 / 11

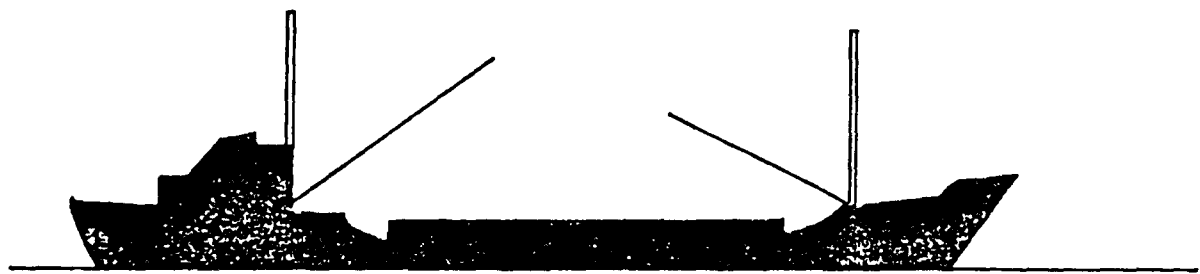
Since the controlled depths used for classification purposes are minimum figures, vessels of deeper draft than implied by the controlled depth figures can be used for much of the year.

Vessels. There are two distinct type of vessels used in the domestic waters of Bangladesh. They are "bay crossing" meaning seagoing and certified to make the short crossing of part of Bay of Bengal from Chittagong into the lower Meghna river, and "inland". Generally operating costs of inland vessels are lower than those capable of bay crossing. Country boats are also a very important means of inland water transport. Estimated size of the operational cargo fleet is in Table 4.1. The cargo carrying units have an external appearance generally as indicated in Figure 4.5.

According to the consultants the most favourable vessel for bay crossing should be the coaster of 600tons dwt or more, with preferably a sizable hold and breadth in excess of 10.5m which should give a minimum capacity of 24TEUs with hold stowage and one high on top of the hatches.

A bay crossing barge of the two hold configuration of 45m length could provide an alternative to the coaster but with a reduced capacity. For inland waterways use, the flat of approximately 70m length will provide a 48TEU capacity. No other vessel has been favourably viewed.

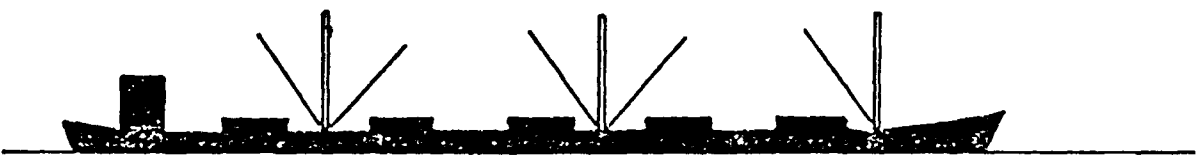
The existing vessels potentially suitable for con-



Coaster



Cargo Vessel



Flat, Bay Crossing



Barge, Bay Crossing



Inland Flat



Inland Barge

METRES 0 10 20 30 40 50 60 70

SCALE : 1/500

## TYPES OF CARGO CARRYING VESSELS

Source : Transport of Containers in Bangladesh , 85

FIG NO 4.5

tainers are as follows :

Chittagong route - 11 Coasters (7 Public + 4 Private Sector), Two of 44TEUs and others of 24TEUs.

16 Bay crossing barges (Public Sector) . 20TEUs, already in service .

Mongla route -- 8 Self propelled barges and 8 Flats, already in service.

**TABLE 4.1**  
**ESTIMATED SIZE OF OPERATIONAL CARGO FLEET '85**  
(BIWTC & PRIVATE)

	Bay Crossing	Inland
Coaster	96	-
Cargo Vessel	-	564
Tug	6	168
Flat	6	91
Barge	51	685
Tanker	29	8
Total	188	1516

**Ports and Traffic.** The most important inland port for containers are Chittagong , Mongla , Narayanganj and Baghabari. Collectively Dhaka , Narayanganj and other IWT ports in Dhaka area presently handle 80-90% of the traffic volume handled by Chittagong IWT port , mostly to and from Chittagong .

**Railways.** Bangladesh Railways is a state owned and state managed organisation . The railway is split



into two administrative zones . East and West , with their headquarters at Chittagong and Rajshahi respectively .

The West zone comprises both BG and MG tracks , whilst the East zone is entirely MG ie east of the Jamuna river including the Chittagong-Dhaka route .

The rail distance between Chittagong and Dhaka is 321km . This is longer than the road distance because the rail route goes further north than the road in order to bridge the Meghna and other rivers . Because of the flat country there are relatively few gradients .

A single track line continues north from Akhaura Junction towards Sylhet . If it proves technically and economically feasible to move tea in containers from the Sylhet area , most probably from Srimangal , this line would be used .

Nepal transit traffic to and from Chittagong if any would be routed over the MG throughout . The route would be Chittagong-Akhaura-Ferry at Bahadurabad via Parbatipur to the Indian border at Biral.

The rail ferry is currently experiencing much difficulty owing to siltation , causing delays and congestion to cross Jamuna traffic . In the longer term a MG track may be provided on the projected Jamuna bridge .

Maximum permissible speed on MG main lines is 72Kph Locomotives with a maximum axle load of 11.94mtons are permitted on main lines . The Chittagong-Dhaka section has 3 double line stretches amounting to 122km out of

321km .

The Chittagong-Dhaka line has bridges varying from 1/2m To 900m of various types , major ones are of steel girder type .

The effects of monsoon and storm are very severe on Bangladesh railways . During heavy rains between June and September , various bridges under the track and embankments are under pressure and sometimes results in bridge washouts or embankment breaches . BR have equipped themselves to counter these problems .

Improvement projects in the current five year plan (85-90) include rehabilitation of passenger and freight rolling stock and upgrading of the BG main route , west of the Jumuna . Other major projects include the upgrading of the Sylhet-Akhaura , Bhairab Bazar-Dewanganj Bazar and Bonpara-Dinajpur lines . All are relevant to container service development , the first for export tea and the later two for Nepal transit and other cross Jamuna traffic.

For the initial container services planned to operate from Chittagong port to the pilot Kamalapur ICD in Dhaka , rolling stock has been provided by conversion of existing wagons . These are of two types : covered CJ 4 wheel wagons and BFR rail truck boggies . 47 four wheel wagons and 13 boggie vehicles have been allocated for conversion . The boggie wagons are potentially capable of carrying 40ft containers . the 4 wheel wagons can carry 20ft containers - lightly loaded ie less than 21.3 tonnes gross .

There are over 9000 CJ covered 4 wheel wagons available to BR, a number considerably in excess of the current or the envisaged future requirements . BR has 77 BFR flat rail truck boggies having a length over hard stock of 13.1m and 87 a length of 11m . Only the former are long enough to carry 40ft containers . Not many of these could be spared for conversion as these are required for departmental use.

As an alternative , considerable number of other types of bogie wagons exist , from tank wagons through to more modern BC bogie covered wagon . As a result of the substantial reduction in freight traffic of recent years, it is likely that the productivity of these wagons has fallen and a number could probably be identified as surplus to immediate requirements and available for conversion . Unfortunately , none of these wagons are long enough to carry 40ft containers .

The BR has a total fleet of 290 locomotives , 150 in the East zone and 140 in the West. The container service will look to BR to provide with reliable , well maintained locomotives from adjacent depots at appropriate times to operate the advertised train schedules . Dedicated locomotives would be desirable .

Interim ICD at Dhaka. A major development required to operate rail container services on the Dhaka Chittagong route is an Inland Clearance Depot (ICD) in the Dhaka area . A start has been made by conversion of some existing facilities at Kamalapur Railway station to provide an interim ICD . In conjunction with a small fleet of converted freight wagons , this pilot operation

is providing facilities required to enable the container service to be run upto Dhaka . It started in April '87 .

Provided the ICD is operated efficiently and the associated rail services run according to plan , shippers will become acquainted with the benefits of throughout movement of containers and traffic can be expected to increase steadily .

The capacity of the interim ICD facility is likely to be quickly reached (may be by 1989-90) and there will be a requirement for a larger purpose designed depot. The interim ICD capacity is 4100 import TEU and 4100 export TEU annually. Customs inspection facility is available at the ICD .

Two trains a week run now (upto 88-89) . Three trains a week is expected to run from FY89-90 to FY90-91. Train sizes would increase progressively throughout the period .

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## CHAPTER V

### EVALUATION OF CONTAINERISATION

*"Containerisation of developing country trades is proceeding apace ; by 1990 it is unlikely that any purely break-bulk liner services will remain".*

(Containerisation in the Eighties by M G Graham & D O Huges , '85)

#### Introduction

More than a decade ago , at the time the International Multimodal Transport Convention was being proposed in Geneva , doubts and fears were being expressed in developing countries about the problems of providing container services for them and the "threat" posed by the multimodal transport operators (MTOs) . Containerisation was seen by developing countries as a sophisticated, expensive invention of the industrial trading countries deceived into accepting without thought for their needs , controlled by multinational operators many thousands of miles away and requiring expensive investments in ports and inland transport facilities which the developing countries could not afford .

Today , many problems remain , but much of the emotion has evaporated . This is partly because time has dispelled the worst fears and given an opportunity for the benefits of container services to be seen first hand. The Western operators have also been able to point out several basic considerations about the adoption of con-

tainer services in developing country trades , which have largely been accepted in the Third World . (23)

These basic considerations listed in "Containerisation in the Eighties" by M G Graham & D O Hughes are briefly discussed below.

### Basic Considerations For Adoption Of Container Services In Developing Country Trades

a . There are the sheer advantages of being able to put the goods in container , advantages for which developing country goods are suited as others. Developing country ports have been particularly prone to congestion , delay , loss and pilferage . Containers have improved that , reduced the losses and improved the outturn . Some types of developing country produce , like tropical fruits , gain particularly from the fine temperature control possible with insulated containers . Ventilated containers can be used when necessary . Simpler packaging has been possible with many products particularly semi-bulk and bagged cargo . Certain dirty cargoes like hides , skins and bones , unpopular with western dockers at destination can be satisfactorily handled in lined containers .

b . The imbalances in developing country liner trade have proved less severe and less of a disadvantage than feared . Western operators have been able to point out that no container trades are perfectly balanced and that containerisation does not make developing country liner trade imbalances any worse , indeed in some cases it can make them better

by means of triangulation . There is no denying the fact that empty containers do have to be moved , but this is one of the costs of container services paid for by productivity improvements elsewhere in the service . Also cross subsidisation of lower value cargoes , like developing country produce exports , by the higher value manufactures , is not disturbed by containerisation . Some of the bulk cargoes were traditionally carried with liner cargo e g , logs from West Africa , moving along with bagged coffee . The coffee is container compatible, the logs are not . The result is that efficient bulkers have been developed to specialise in the log trade, thus lowering costs and also providing space for containers , vehicles and so on in the inland run to West Africa which competes with the container services and presses downwards on rates . The conbulker may take some of this traffic . The optimum balance between type of service depends on cases . The main point is that there is a competitive situation and no inherent disadvantage to the developing countries .

c . The traders in industrial countries took the advantages of containerisation for granted once these countries had geared themselves up to the use of containers . They were calling for their use to carry the liner goods they imported from developing countries . The exporters of produce and other developing country cargoes who geared up to use containers would have a quality or convenience edge over the others . Those that did not , risked being left behind . With the passage of time there is less conventional handling capability left in deve-



loped countries and it becomes virtually necessary that trade is served by containers.

d . Not everything has to be done at once - it is not all or nothing . Operators have emphasised the gradual approach . Progress can be made and benefits achieved gradually in two senses . Not all trades have to be containerised at once . The most important , or those involving least problems , can be dealt with first - for Bangladesh it could be garments , frozen food , etc to start with , Neither do all parts of the through transport chain have to be geared at once , particularly the inland leg .

In many developing countries , because inland communications are poor and Bangladesh is such a case , a great deal of industrial activity takes place in the vicinity of the ports . These key areas can benefit directly from door to door container traffic . In many developing countries , much of the produce comes from the hinterland and traditionally moves to the port area in cargo lots suitable for shipping into break-bulk vessels . Containers in such cases could be packed in the port area , as is being done in Chittagong port now , and the advantages of containerisation in terms of port and ship productivity and in terms of the requirements of the other end of the trade can still be met . Inland transport communications to key areas can be improved over time as money is available and the whole process of access of containers to the hinterland can thus be stepped out over a period of time . This would apply to Bangladesh too .

e . The majority of those providing through transport services (MTOs) are the ship owners who have been present in liner trades for many years and who , together with their shipping agents , are well known commercial entities in the developing countries with whom they trade . Where non vessel owning operator (NVO) carriers offer services , they are again mostly known forwarding companies or groups of them , familiar with the needs , laws and customs of the countries in which they operate .

f . Finally there is the point that containerisation has developed in a way responsive to cooperative ventures . The European and Japanese ship owners have evolved consortium fleets . In some cases they have invested jointly in terminals. The shipping agencies have taken on the organisation of landside operators at the other end of the trades , a method being extended to developing countries . The opportunity thus exists for joint container service ventures between developed and developing countries . Asian and European lines have become members of the African Container Express (ACE) group in the Far East trade . Though number of such ventures has been limited , but there is reason to hope that more such joint arrangements will be made eventually .

With the passing of time , perceptions in developing countries of the considerations described above have eased their worst fears. This paves the way for progress. There are , however , still some particular problems which need to be tackled if container services in developing country trades are to be successful .

Before these particular problems are discussed , we shall first expand a little more on the advantages of container services .

### The Advantages of Container Services

a . More Reliable Performance. Container services have achieved high reliability . One of the reasons for this is that container services usually achieve a high degree of port rationalisation and this leads to more even predictable schedules which the traders value above all . Provided a service is predictable , traders can make plans and keep them. The other reason is that there is the smoothness and efficiency in handling cargo on and off container ships and across container berths ; this has greatly reduced port congestion and delay . Container services have shown a better ability to perform partly for intrinsic reasons and partly because priority berthing has been given to them in many countries . The real solution lies in the provision of new facilities .

b . Faster Transit . In container services , goods spend little time sitting about for a variety of reasons ; therefore faster door to door transit times can be achieved . Container ships need not travel faster than break bulk liners , though they often do . Greater in-movement speed would be cost increasing , whereas reduction of static time is cost reducing . This reduction is achieved first because the interface between sea and land is more efficient and secondly because container services usually make fewer port calls .

Faster transit times reduce the disadvantage of distances from the market . It follows that because there are less goods tied up in transit at an "average moment" and so less capital is tied up. The resultant saving in interest is shared between traders at either end of the trade , according to the terms of the contract .

The combination of greater reliability and faster transit produces another real saving , in that stocks are able to be replenished more quickly and with greater certainty . The reservoir of stock an importer needs to hold can thus be safely reduced by considerable amounts and again there is a saving in working capital to be made .

c . Protection of Cargo . Containers afford greater protection of cargo in the following ways:

- \* The physical protection of the cargo from damage by crushing , scuffing etc is much greater. Yet this can be achieved by use of lighter packs .

- \* Money is saved ; on materials , by freeing labour , hitherto engaged in making up elaborate packs , for other tasks , and also on freight hitherto paid on crates , cases ,etc .

- \* The opportunities for pilferage are greatly reduced . As cargo is no longer in the system in loose form , the incidence of loss is greatly reduced .

\* The number of occasions on which the cargo is handled is usually reduced . This in turn reduces the opportunities for damage , delay , mis sorting and pilferage .

d . Insurance. Container operators in international trade state that the marked improvements in quality of service through the protection of cargo in containers and their proper routeing had a marked effect upon the container operators cargo claims ; both claims and payments against claims have been markedly reduced . The proportion of total cargo insurance borne by the container operators is greater than the proportion traditionally borne by liner operators . Most claims begin by being a claim against the carrier and the number of claims so presented has decreased greatly since the advent of the container services , so much so that dramatic reductions in operators' overheads related to insurance have been possible .

Improved insurance performance is important to traders in three ways : First , their own insurance costs are lower . Secondly , if the operators insurance costs are reduced , the pressure on increasing freight rates is eased . Thirdly , and most importantly , insurance seldom if ever recoups the goodwill of customers lost to a trader through failure to deliver - regardless of whose fault it is ; if the number of claims is reduced , then goodwill is better protected .

e . General Average. Break-bulk cargoes , particularly of certain types of produce , are more susceptible to fire risk than cargo in containers . In such cases general average is normally applied . This particular hazard is virtually absent from container ships . Navigational hazards are , of course not entirely eliminated and general average is then applied , but there has been a marked decrease in their number . (24)

### Problems in Adapting Container Services

The main problems encountered in adapting container services to developing country needs are : availability of skilled management , provision of capital and a surplus of labour , often unskilled . All these problems apply to Bangladesh also . We shall discuss each one of them separately .

Management. Containerisation is a management intensive operation . Good calibre management is required to direct the flow of containers and the documentation appertaining to them . It is obvious that managers need to be trained in container control and in the computer software needed for essential tracking systems and production of commercial documentation .

Western companies have developed their shipping agencies to perform these tasks in developing countries , they have had the training of staff in their own hands , supplemented by secondments . For the developing countries to build up an adequate central experience and expertise of their own - the joint venture is obviously one way to bridge the gap ; secondment of staff is ano-

ther , but the developing countries are very conscious of the proportion of foreign nationals to national staff . They do not want to see commercial control of their industries and revenues slip out of their own hands . The UN and other bodies , including Western operators , also provide staff training schemes in container service management . Good training is essential , but it is important that supervision is not removed too soon .

Provision of Capital. Provision of capital is always a problem in developing countries . Container service is capital intensive - due to the scale economies of large ships and specialist berths and with new areas of investment in containers and computers . Behind it all there is the pressure for money to be spent in infrastructure developments .

The high productivity of container services may actually reduce capital needs . It has been calculated that one container ship and accompanying containers would cost less than the four to six smaller , less complicated break-bulk vessels which would be required to do the same work without containerisation . The one container berth and back up terminal facilities would certainly cost less to build than the seven to nine conventional berths which would otherwise be needed , especially if conversion of existing berths is involved . In the seventies , without realising these facts a lot of capital was wasted which were spent in obsolete schemes in the third world .

Developing countries can now take advantage of the development of containership technology and fleets. They, including Bangladesh could buy second hand ships or charter them . Charter rates and second hand prices are rela-

tively low and where capital is spent on purchase , ship mortgage finance is available on favourable terms . Containers could also be leased rather than purchased . Though operating with owned containers is likely to be cheaper than with leased containers , provided their use could be guaranteed .

New developments may be financed by private investment , aid fund or recourse to international loans such as those provided by the World Bank . Joint ventures are a suitable way of attracting foreign private capital and in a way which does not take up local capital . Funds would be available for ventures like the provision of terminal facilities or packing depots and repair shops . The World Bank and other agencies have publicly stated that they regard port infrastructure investment as a suitable use for their loan funds . The multipurpose berth project in Chittagong is being funded by the World Bank.

**Foreign Exchange.** Foreign Exchange is a related problem and a crucial question for developing countries . First , selling cif (or delivered) on a multimodal tariff does afford an opportunity to earn foreign exchange , but it must be remembered that one country selling freight paid means another buying freight paid . As with conventional shipping services the terms of trading are entirely a matter between buyer and seller . The MTO takes instruction on the terms of trading and in no way dictates them . Some developing countries - and they are not alone - seek to capture freight on their imports by a process of fob buying and steering import cargo to their own national lines , who then benefit from the transaction and minimise the exposure to foreign exchange outlay . However , such action may provoke retaliation .



The stronger the national lines of the developing countries become commercially , the more able are they to earn foreign exchange without recourse to methods which are bound to cause some conflict . This is part of the 40/40/20 topic of the UN Liner Code .

Doubts have been expressed concerning payment for inland transport services of containers namely that payment might be required to foreign based MTOs in foreign currency , even where costs arise in local currency . In practice , it is normal for inland legs to continue to be paid for separately in local currency . This avoids a foreign exchange drain . If an operator did not earn local currency to pay for inland transport operations , then he would have to buy it and the national accounts would show an inflow for this purpose . On the whole the chances of unconvertible local currency reserves or unremittable profit from local operations building up in this way are not great , because container services involve a number of unremunerated or under remunerated activities like local imbalanced movements and container repair costs and thus require some cross-subsidy from seafreight

Seafreight earned by a foreign line is usually remittable , which is usually in dollars and where paid locally in local currency is convertible on being remitted abroad .

Labour. In developing countries there is abundant supply of cheap labour . There is a dilemma in these countries' economies in that the adoption of techniques which increase productivity is necessary to increase living standards , but often brings short to medium term difficulties in adopting to change . Containerisation is

a high productivity operation . It brings advantages in efficiency and utilisation of capital . Even in the short run , containerisation creates new jobs as well as reducing some of the traditional ones in the ships hold and on the quay . There may be an immediate pressure on the amount of port labour required , leading to counter demands for no reduction in the labour force , which in turn reduces the gain in real productivity .

Where containers are packed and unpacked in or near the port , like in Bangladesh , there is employment in packing depots directly related to port work and there will be some work for maintenance and repair of containers and equipment.

Container berths are usually worked intensively to gain maximum use of capital equipment , thus requiring an increase in the number of shifts to cover the working week .

In the longer term , the efficient through transport of exports and imports assists the promotion of economic development and helps to create work in the other sectors of the economy . Some such benefits may begin to show quite quickly . (25) & (26)

### The Importance And Need for The Introduction of Containerisation in Bangladesh

On analysis of the basic considerations ,the advantages and the problems discussed above , we find that by adapting to containerisation Bangladesh definitely would be a gainer .

It is seen from Table 2.1 that Bangladesh still handles relatively few containers , recent growth is however been fast . The trend world over now is towards containerisation . Bangladesh should not lag behind.

If Bangladesh do not gear up to use containers , she would be risking being left behind . As has been discussed earlier not everything has to be done at once , it should be done taking the gradual approach .

The containerisable exports of Bangladesh are : raw jute and jute goods - 73% , tea - 5% , hides and skins - 4% , frozen foods - 7% , garments - 8% and handicrafts -1% , others - 2% . (27)

The containerisable imports are : food and drink - 20% , garments and materials - 16% , chemicals and pharmaceuticals 18% , machinery and spare parts - 15% , metals and other industrial raw materials - 22% , personal effects and other supplies - 9% .

Container traffic is expected to grow rapidly . At Chittagong , reaching 138000 TEUs p a by FY92-3 and 234000 TEUs p a by FY97-8 , over half of which is expected to originate or be destined for the Dhaka area . Only very limited prospects exist for containerisation outside the Chittagong - Dhaka corridor . (Consultants estimates in RCTS)

On the routes between Bangladesh and the industrialised countries , there is considerable potential for expanding containerisation and this is likely to ensure substantial growth in Bangladesh container traffic in the

foreseeable future . On the other hand , much of Bangladesh's trade is on routes presently not containerised , such as to China , Pakistan and Eastern Europe . Therefore , overall high levels of containerisation cannot be achieved unless container services are provided to these countries . Containerisation is likely to spread to such services , but penetration in the foreseeable future is likely to be slow . Bangladesh therefore can afford to go slow .

A survey suggested that most importers and exporters of Bangladesh are well aware of the advantages of containerisation . A system of inland container transport is attractive to them . They consider such a development to be an essential requirement for the expansion of trade and commerce in Bangladesh . They see reductions of pilferage and damage as the principal benefits of an inland transport system together with speed of service and the opportunity for personal supervision of cargo clearance . (RCTS) .

For such a service to operate successfully customs procedures , back-up facilities and proper equipment are needed to be available . Once such a system is established it has to be reliable . In other words , efficient , commercially oriented and operation of ICD and road , rail or inland waterway service are essential for any project to be competitive or viable . Parallel changes in customs and commercial procedures must be achieved , removing institutional obstacles to door to door container movement.

#### REFERENCES TO CHAPTER V

- (23) Graham M G , D O Huges , Containerisation in the Eighties , Lloyds of London Press Ltd '85 .
- (24) International Container Transport : Its Application in Developing Countries , International Chamber of Commerce , Publication No 314 - '77 .
- (25) As cited in (23) above .
- (26) As cited in (24) above .
- (27) Rail Container Transport Study - Bangladesh , Draft Final Report - Prepared for Asian Development Bank acting as executive agency for UNDP - September '87 .

## CHAPTER VI

### PROJECT FORMULATION FOR CONTAINERISATION

#### Desired Changes in Institutional Procedures and Documentation

Use of Computers. In the early days of containerisation it was commonly said that -  
*"What is the good of speeding up the flow of goods if the paperwork cannot keep up".*

(Containerisation in the Eighties by M G Graham and D O Huges , '85) .

Part of this issue has been a facilitation matter .

For containerisation the fundamental operational changes required are an adequate and upto date documentation and information system which meets the internal demands of effective arrangements and external demands of the forwarders and shipping lines . Such documentation system can either be designed as a manual system or as a computer system . The decision of choice depends mainly on the quantity of containers to be handled per year and the extent to which the general objectives of a container terminal should be fulfilled . Therefore a system must be used by terminals which can relate each particular container to the information required for efficient yard marshalling and proper sequential loading or discharge . Such a system is fundamentally one of data acquisition , storage , processing requirements , tailored to suit the special requirement of the container terminal operations. The objectives for an integrated information system is in

# OBJECTIVES FOR AN INTEGRATED INFORMATION SYSTEM

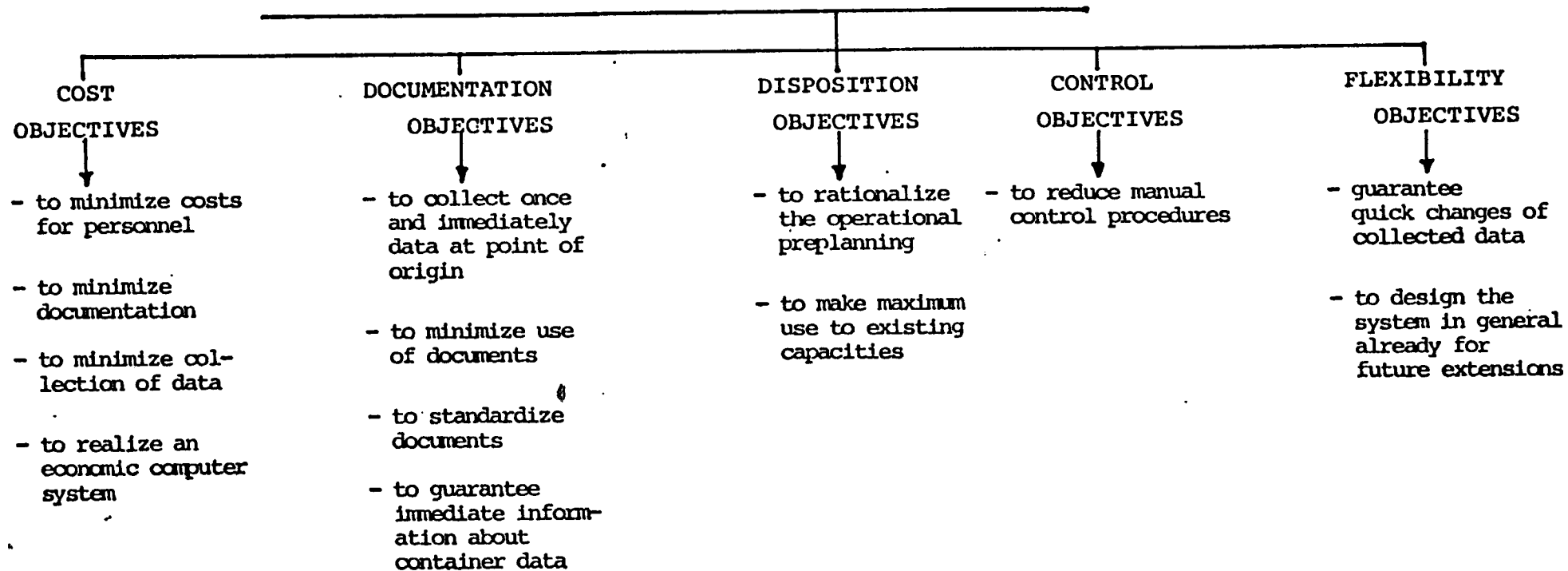


TABLE : 6.1

Source : Fiedler G , Port Management Textbook-Containerisation

Table 6.1 .

The result of an analysis is that the realisation of the objectives , combined with a turnover figure of more than 100000 containers p a requires a computer system which should be designed as an on line system . Computer systems based on punching cards suffer from time lags between data collection and availability of data (in reports) for the various departments . (Documentation -Information Systems by G Fielder in Port Management Text book - Containerisation , '85) . Since Chittagong port is expected to handle more than 100000 containers p a by FY91-2 it would be a wise decision to introduce computer for container handling there .

An implementation of computer system has to be performed carefully as it normally implies fundamental changes of existing organisational and operational procedures . Therefore such a computer should be implemented in stages in order to avoid an over charge of the personnel concerned .

Experiences show that it is of real advantage to implement a computer system as a first step , which is able to handle the minimum requirements without negligence of the integrational aspects of the :

- \* Service Department - advice from agents , forwarders .
- \* Yard Control Office -- disposition of containers , shuffling of containers , completion of data (location etc)
- \* Reception Department- dock receipts , delivery orders , check of advice ,etc.



- \* Ships Operation        -    operational preplanning ,  
Control office            manifests/stowage plans,etc.
- \* Gate                    -    Inspection of containers ,  
                             weight seal , etc .
- \* Administrative        -    reports , statistics , data  
Control                   transfer to Port Authority .
- \* Agents/Forwarders , Management , Customs , etc .

Nevertheless such a "minimum system" must already be designed for future extensions and further rationalisation of administrative procedures which will be realised by computer in a subsequent stage. An integrated container terminal system is illustrated in Figure 6.1 . (28)

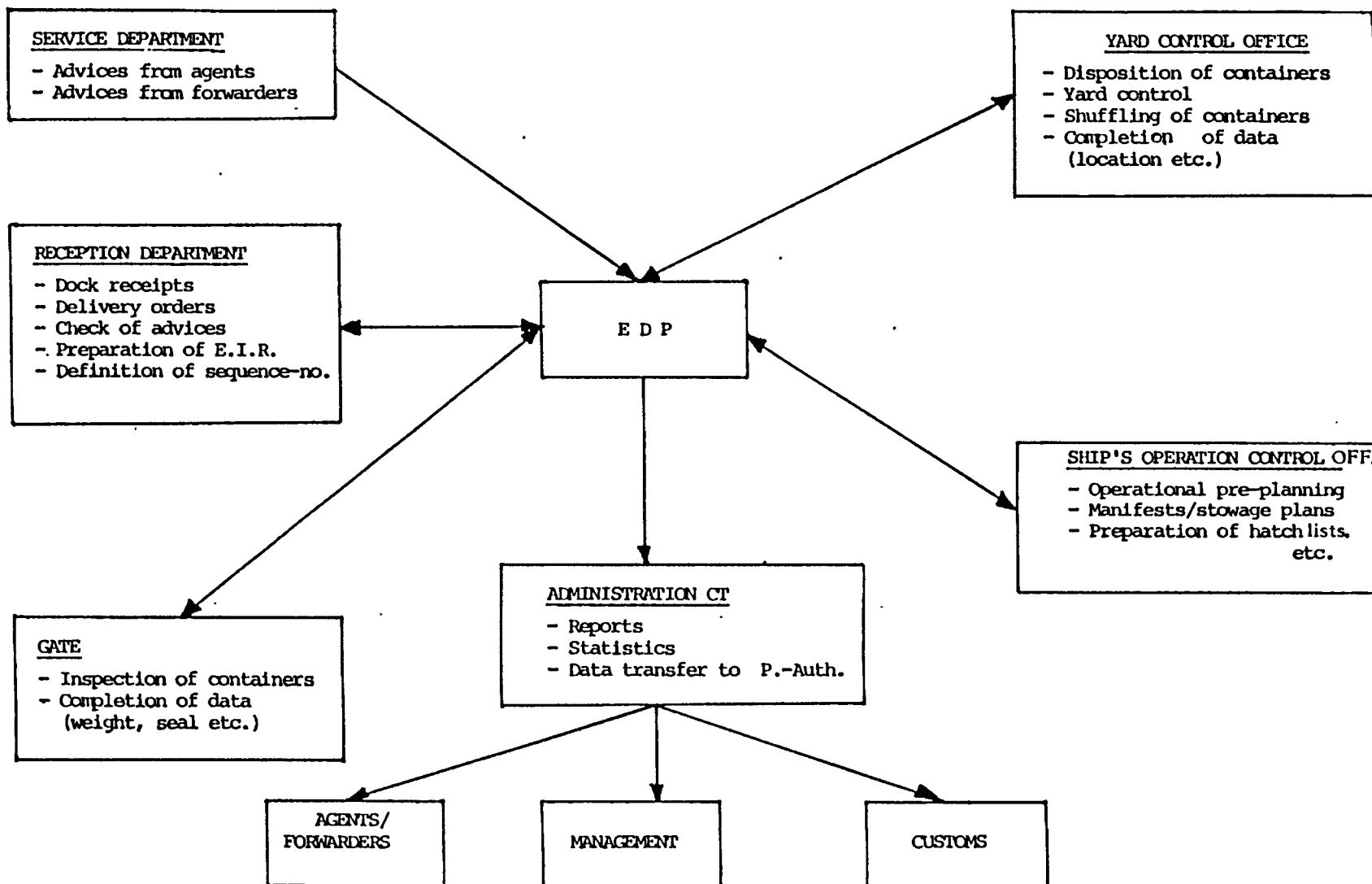
### Institutional Framework

The management operation and ownership of the over-all container service and ICD needs much thought and attention . There are a number of options which are listed in Table 6.2 . These include various permutations of public sector bodies , including BR and CPA , private sector and joint ventures between public and private sectors . The criteria by which the options are to be evaluated are :

a . To maximise the benefits of containerisation , reduce delay , damage , lower insurance , etc for users, increase trade .

b . To ensure the benefits of door to door containerisation are widely and equitably distributed across the economy .

# INTEGRATED CONTAINER TERMINAL SYSTEM (ICTS)



Source : Fiedler G , Port Management Textbook-Containerisation

FIG NO 6.1

TABLE 6.2

OPTIONS FOR MANAGEMENT

Options	Overall Service Management	ICD Ownership	Rail Service Provision	ICD Management & Operation	Road Distribution From ICD	Remarks
A	Integrated management	Public sector	BR	a.Public b.Contract with private operator c.Facilities leased to private sector	a.Public b.Contract c.Private	Public sector may include BR, CPA, ESC, etc
B	Integrated management	Private	BR	Private	Private	Local companies only
C	Integrated management	Jt venture a.Public/private b.Public/private/foreign c.Private/foreign	BR	a.Jt venture b.Contract with operator c.Lease with operator	a.Contract b.Private	Levels of participation may be varied
D	Separate management	None	BR	a. Private b. Jt Venture	Private	Each activity is managed independently

Source : RCTS

c . To promote efficient operations through effective management , competition or other means .

d . To permit unrestricted use of the ICD on a non discriminatory basis to users .

The criterias concerned should relate to national requirements , rather than those of any individual organisation .

There are no hard and fast rules about what type of organisation owns , manages or operates an ICD . The following are examples of ICD operators :

Port Authority , Shipping Lines , Railway Authority  
Freight Forwarding Company , Road Haulage Company ,  
Joint Company formed by consortium of interests .

In India , the ICDs are all operated by the Railways , mainly because the inland transportation is more railway oriented than in most countries .

The consultants in RCTS recommend that a public limited company be set up to manage the overall service and ICD . It could be called the Bangladesh Container Company (BNCC) . Its owners would be BR , CPA and the private sector having a third share each. The company itself should be set up as a joint stock company able to operate in an entrepreneurial and businesslike manner .

The consultants believe that BNCC should undertake all operations associated with ICD but should not seek to establish itself as a freight forwarder , customs clearance agent or Non-Vessel Owning Common Carrier (NVOCC) .

Its dominant position may allow it an unfair advantage over competitors. There may also be commercial advantages in avoiding direct competition with potential users , some of whom will be engaged in these activities . (29)

### Present State and Changes Required

The institutional procedures and documentation at present are not designed to facilitate door to door container movement . The reasons that most containers are stuffed or stripped in port areas is as much a result of inappropriate procedures and documentation as of lack of suitable inland transport equipment and infrastructure.

The customs have agreed to undertake container clearance at the interim ICD . Opportunity now exists to progressively improve institutional procedures and practice in advance of provision of a permanent ICD at Dhaka. This process has now begun but difficulties should not be underestimated .

The most important areas where significant changes are required are as follows :

- \* terms of trade ,
- \* simplification of trade procedures .,
- \* exchange control regulations ,
- \* customs ,
- \* adoption of Custom Cooperation Council conventions
- \* rail contract of carriage and insurance.

These involve a whole range of public bodies - Ministry of Commerce , National Board of Revenue , Bangladesh Bank, Sadharan Bima Corporation , BR and CPA .

There is a general willingness of most bodies to change in their activities , they recognise that containerisation is important .

In Bangladesh the relative importance to the economy , of customs duties and trade restrictions is very much greater than in developed and many other developing countries . Some 60 % of national revenue is raised through customs duties and this , with import prohibitions is a major instrument of national economic policy . (RCTS) .

A well developed freight forwarding industry does not exist in Bangladesh which is a must for door to door container transport . There is only one firm that might be considered a real freight forwarder .There are many C&F agents but few have shown much interest in developing wider transport expertise beyond traditional customs broking and haulage contracting . Steps are needed to promote a larger and more active forwarding activity .

### Customs

Currently containerised cargo is generally treated by customs and other organisations concerned as ordinary break-bulk cargo . Almost all containers are stripped or stuffed inside port areas . Inland distribution is arranged and carried out as a domestic operation.

Customs clearance was provided at the ICD established at Dhaka in 1987.

Customs require a bond or deposit to be paid on all

containers leaving port areas . This and the need to re - load goods after inspection further discourage inland movement of containers .

Containerisation initially imposes more pressure on the customs department . It clearly presents more opportunities for smuggling and greater vigilance is necessary until equivalent improvements have been made in the control procedures .

The broadening and diversity of the clearance frontiers also requires more control and the setting up of additional procedures to monitor transit documents , which may require additional staff . Customs have to conduct close and frequent reviews of their procedures and documents ( which have not been revised for many years ) becoming increasingly unsuitable and develop random inspection techniques which can be statistically designed to achieve predicted levels of detection for given throughputs .

The Customs department in Bangladesh , as elsewhere is frequently criticised for being unfair , inconsistent and obstructive. Much of this may well be true but the criticism might be less harsh if it were realised that unusual responsibilities and difficulties the department faces . For example the tariffs and restrictions are not only very complicated , they are also frequently changed. New lists are issued every year and a number of changes made during the year by Gazette Notice . Customs have the revenue raising responsibility of 60% of government revenue through customs duties , etc .

It is not surprising that customs officers have

difficulty in keeping up with the mass of detailed legislation . It is in fact self defeating in its objectives.

The relevance to container transport is that the difficulties of clearing any but the most straight forward consignments - machinery and spare parts for example greatly increase the container dwell times and the amounts that have to be invested in providing additional storage capacity.

### Documentation

According to recent surveys in the USA ,the current average documentation cost per deepsea shipment is about US\$ 400 . A typical split of this amount in US\$ would be:

a. Shipper	180
b. Forwarder	70
c. Carrier	50
d. Bank	50
e. Insurance company	20
f. Government (e g : customs , Statistical services etc)	30

Source : Containerisation International - February '86 .

Unit labour costs in Bangladesh are obviously much less than in the USA . On the other hand procedures are more cumbersome , more documents are involved and their processing is slower and less efficient , so that processing costs may well be of the same order .

In any event it is clear that substantial costs are incurred in documentary processes and significant savings



can be realised if the documents and procedures can be more efficient.

The consultants in RCTS do not consider that there are very many documentary changes that are essential for inland container transport . The systems are there and they work . What is needed are changes in procedures and attitudes .

Improving documents is easy . It consists first of regularising their size and secondly their format . Documents can and should be reviewed and amended as often as necessary to keep them simple and suitable for their purpose .

Port Authority. The consultants also consider that the documentary control system for container movements in Chittagong port is very good and there is no need to change it . Exactly the same documents and procedures can be used in the ICD . When new stocks are required they should be reviewed for format improvement and possible simplification

Customs. Like the Port Authority , the Customs already have well established procedures for importing and clearing goods , including containers , and no documentary changes are actually essential . However the introduction of an import transit document and equivalent reexport control document has been recommended . The consultants also recommend that the customs should consider implementing more of their control procedures by independent documents . The general principle in Bangladesh is to collect a number of procedural documents together in a large dossier which has its advantages of the documents

less likely to get lost and they give a complete history of the procedures . This may however not be favourable from a security point of view .

Railway. The principle documents required by the railway for the operation are :

- a. Contract of Carriage .
- b. Interchange Agreement - with the principal carrier .
- c. Container Interchange Receipts - recording the transfer of containers between carriers .
- d. Train Manifest - loading records compiled either from Container Interchange Receipts or the Customs Transit Forms moving with the containers for controlling receipt at the delivery end .

ICD Operator. Documents for the ICD operation fall into two categories . The first comprises the documents that are external to the operator itself but which will pass to or through the ICD office and which the operator will need to be aware of. These include ship arrival notification , shipping manifests , bills of lading , import entries , consignment notes etc and are not generated or actioned by the ICD although they may be annotated for receipt or "claused" for discrepancies .

The requirements for the ICD's own documentary system have to be analysed to rationalise and simplify them . Some of the documents are : Removal Tally , Container Card , Seal Slip , Delivery Document , Out of Charge Note , Cargo Traffic Permit , Containers Traffic Permit , Removal Note , Request for Additional Service , Export Cargo Shipping Instructions , etc , Customs Outpass, Container Load List , etc . (32)

### Through Transport Documentation

The ICD offers the opportunity to effect export shipments under through transport documentation. This means that an exporter should be able to deliver his goods to the ICD and be issued with a document of receipt which he can immediately negotiate, i.e., cash at the bank where a letter of credit (l/c) had been arranged by the buyer of the goods. There are two basic types of such negotiable documents.

a. Through Transport Document - Contract of carriage involving more than one carrier. The carrier who issues the document acts as a Principal for the carriage which he is performing but as an Agent for all other carriage.

b. Combined Transport Document - issued by a carrier who contracts as a Principal to effect the whole of the carriage for all the required modes and stages in his own name. Thus he accepts responsibility for the whole trip, although he may sub-contract parts or all of the transport to others.

The problem with the Dhaka ICD arises with export documentation. Imports can be consigned through to Dhaka on the strength of documentation from the origin end but it is not clear now who would issue the negotiable document for exports consigned from Dhaka.

Through transport documentation would not be particularly attractive to the exporter and neither the Rail-

way nor the ICD operator are likely to have the commercial strength to issue Combined Transport Document , at least in the initial stages .

The most likely solution appears to be that shipping lines represented by their agents would issue the Combined Transport Document , having sub-contracted to the Railway for the inland leg to Chittagong . They may choose to engage the ICD operator as their agent actually to conduct this business . Later on , freight forwarders would probably become sufficiently well established to issue their own combined transport document .

None of these arrangements can , however , be forced on the organisations concerned . They will evolve from whatever the respective parties decide to do based on their own commercial judgements .

### Steps Required To Be Taken

With the interim ICD at Kamalapur now operational it would be reasonable to expect that many of the institutional problems will have been solved by FY92-3 , when Phase 1 of ICD is operative . Some organisational and other problems still needs to be solved .

Special steps are required to be taken by the various ministries , BR , Chittagong port and customs to resolve outstanding issues in the following areas :

- a . Decisions must be taken on the setting up of a management company , BNCC , covering organisational and financial structures .

- b . Government sanction for changes in institutional procedures and their introduction .
- c . Definition of responsibilities and function of the ICD management and other departments .
- d . Tariffs and working procedures .
- e . Printing of : instruction manuals for the guidance of staff , guidance brochures for clients, working documents and stationary .

#### Desired Infrastructural and Equipment Changes

To gain the full economic benefits of containerisation it is necessary to offer adequate port facilities for handling and storage of boxes on the one hand , and efficient use of inland transport systems on the other . The latter aspect calls for high density , regular and uninterrupted traffic flows between ports and inland terminals in order to reap the special advantages from the cost structures of railways or inland waterways . Local collection and delivery by road vehicles makes complete door to door services possible .

There is a need for , continuing improvement in the national road system and an increasing fleet of road vehicles suitable for carrying containers . Various terminals for handling containers would have to be developed with associated equipment .

Overall upgrading of transport routes is required , specially the Dhaka-Chittagong and Dhaka-Mongla . Trans-

portation improvements which are required to be made are assumed as follows :

- \* national highway improvements and bridge construction according to a realistic implementation schedule .
- \* a Jamuna bridge at Sirajganj with a single track MG rail connection to be opened in FY92 .
- \* a gradual introduction of larger trucks than the present 5-8 tonnes , after FY92 , including container carrying vehicles .

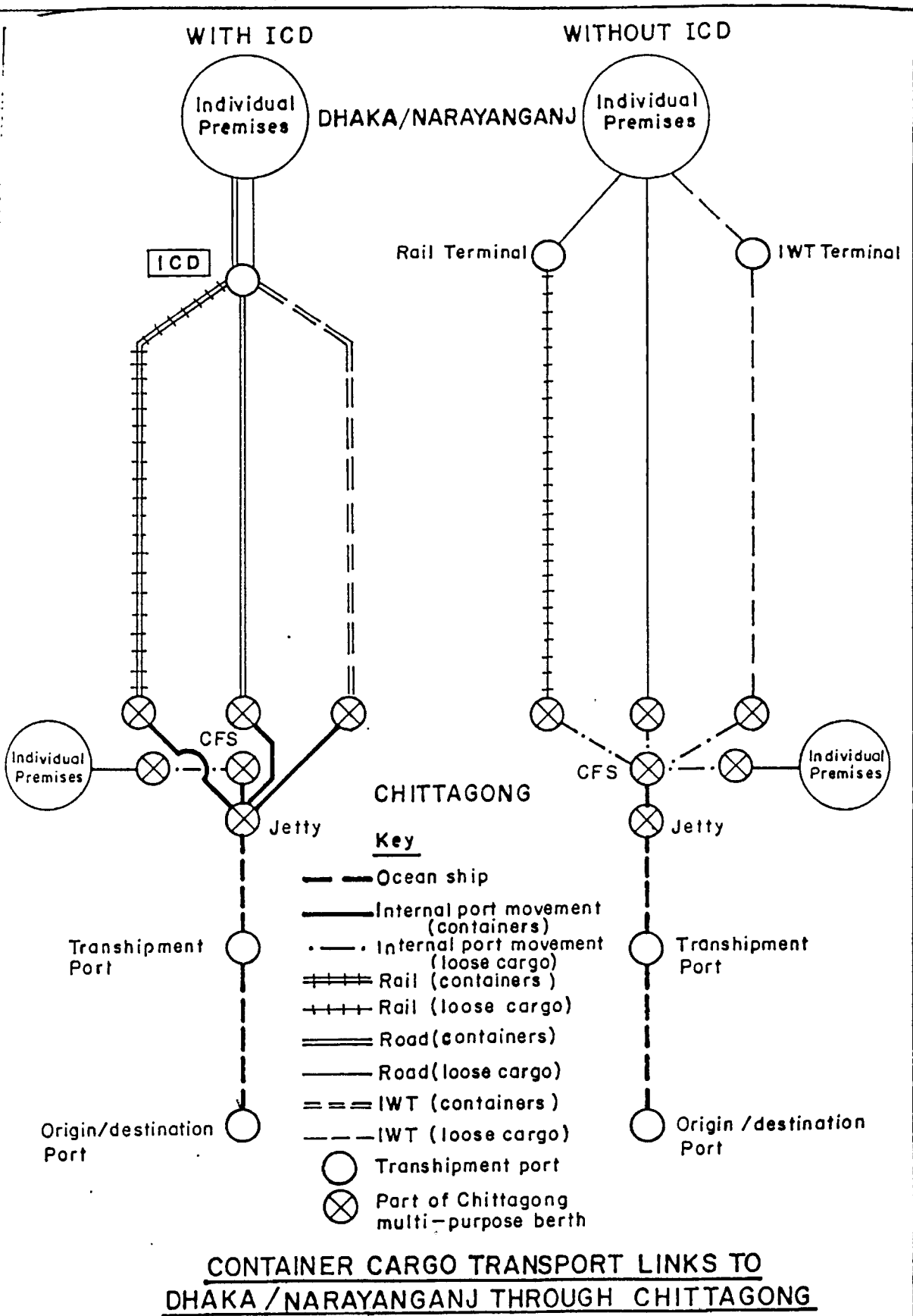
IWT services are available between Mongla and Dhaka (309 km) or Narayanganj (293 km) , with journey duration of roughly 70 hours . Whilst this carries substantial traffic , usage is concentrated amongst bulk commodities and jute . There are currently no facilities for container handling . It is assumed that some modest investment will be made there too . Other developments desired are :

- \* An ICD at Dhaka and associated rail service is required to be introduced by FY92-3 to handle maritime container for greater Dhaka area .

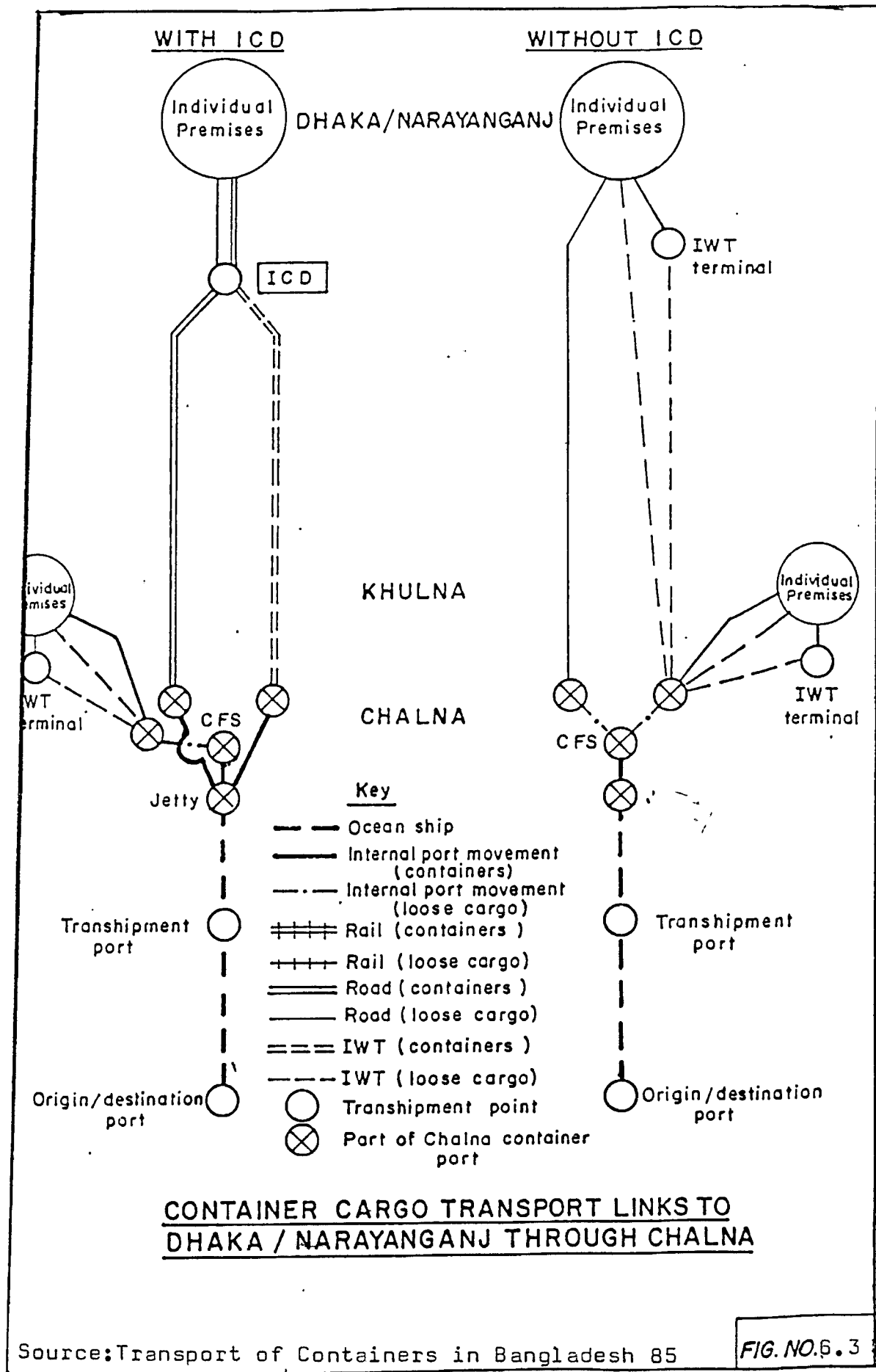
- \* Development of the ports independently to handle containers in the absence of a more integrated national ports policy . But the introduction of an integrated national ports policy would be beneficial .

- \* A rail connection to Mongla is required to be constructed .

- \* the Hardinge rail bridge is required to be decked



CONTAINER CARGO TRANSPORT LINKS TO  
DHAKA /NARAYANGANJ THROUGH CHITTAGONG



Source: Transport of Containers in Bangladesh 85

FIG. NO. 6.3



over to allow use by road traffic .

(35)

Container cargo transport links to Dhaka/Naryanganj through Chittagong and through Chalna/Mongla with and without an ICD are at Figures 6.2 and 6.3 .

### Roads and Bridges

It has been discussed earlier that a number of major rivers in the country have not been bridged so far and have to be crossed on ferries , which not only slows down the traffic , but also places a restriction on the type of vehicles . Ferries which are on important trunk roads such as Dhaka-Chittagong (Gumti) Khulna-Mongla (Rupsa) , Dhaka-Mawa and Dhaka-Sylhet , which have been planned for replacement with bridges in the near future must be implemented .

Poor surfaced roads need to be improved . Road rehabilitation projects must be undertaken . The full length of the road from Chittagong to Dhaka must be upgraded to a sufficient standard for the efficient transport of containers . The Dhaka and Mongla port routes (via Aricha , Daulatdia , Faridpur , Jhennidah , Jessore and Khulna ) and more direct route through Mawa must also be upgraded . For safety reasons the roads which will be used by trucks/trailers loaded with containers must be widened to the common international standard of at least 7.3m (24') .

Alignment of the roads is poor at many locations even on the main trunk roads such as the Dhaka and Chittagong road . The alignment needs to be corrected .

The roads pass through a number of small towns and villages . Bypass roads need to be constructed . Steps should be taken to ensure that activities such as weekly markets which encroach on the highways causing obstructions to the smooth movement of traffic do not do so .

### Vehicles

Articulated vehicles are presently non existent , apparently due to the constraint of ferry crossings . These need to be introduced . It is expected that 3 axle trucks and 20 feet tractor trailers will eventually be introduced .

### Terminals

Various terminals that might be required are :

#### Short Term :

- \* Chittagong Port - To handle national and transit containers through the port .
- \* Dhaka ICD - To handle maritime containers for greater Dhaka area .
- \* Srimangal ICD - Srimangal is the centre of Bangladesh tea production . 95% of overall tea production arises in the Srimangal and Sylhet areas . Tea production is expected to rise from 44000 tonnes in FY86-7 to 72000 tonnes in FY02-3 - 70% of which is exported . A small ICD at Srimangal is desired .

#### Long Term :

- \* Khulna - To handle maritime containers to

and from Mongla port .

\* Parbatipur - To handle maritime containers to and from Chittagong and Mongla for North West region and to exchange Nepal traffic for Mongla between MG and BG.

For a marine container service terminal in a developing country the aim should be maximum flexibility at reasonable cost . Location is important . Many of the traditional liner ports are in river estuaries which form a prime means transport in the country , as is in Bangladesh .

When investment in a main facility is being made , there is a need to look ahead to future requirements . There is a case for saying that berth length and depth of quay and access should be sufficient to handle vessels of around 1800 TEUs with a length of about 215m and draft 11m . This size has established itself as the handy sized container ship .(Containerisation in the Eighties by M G Graham and D O Hughes , '85)

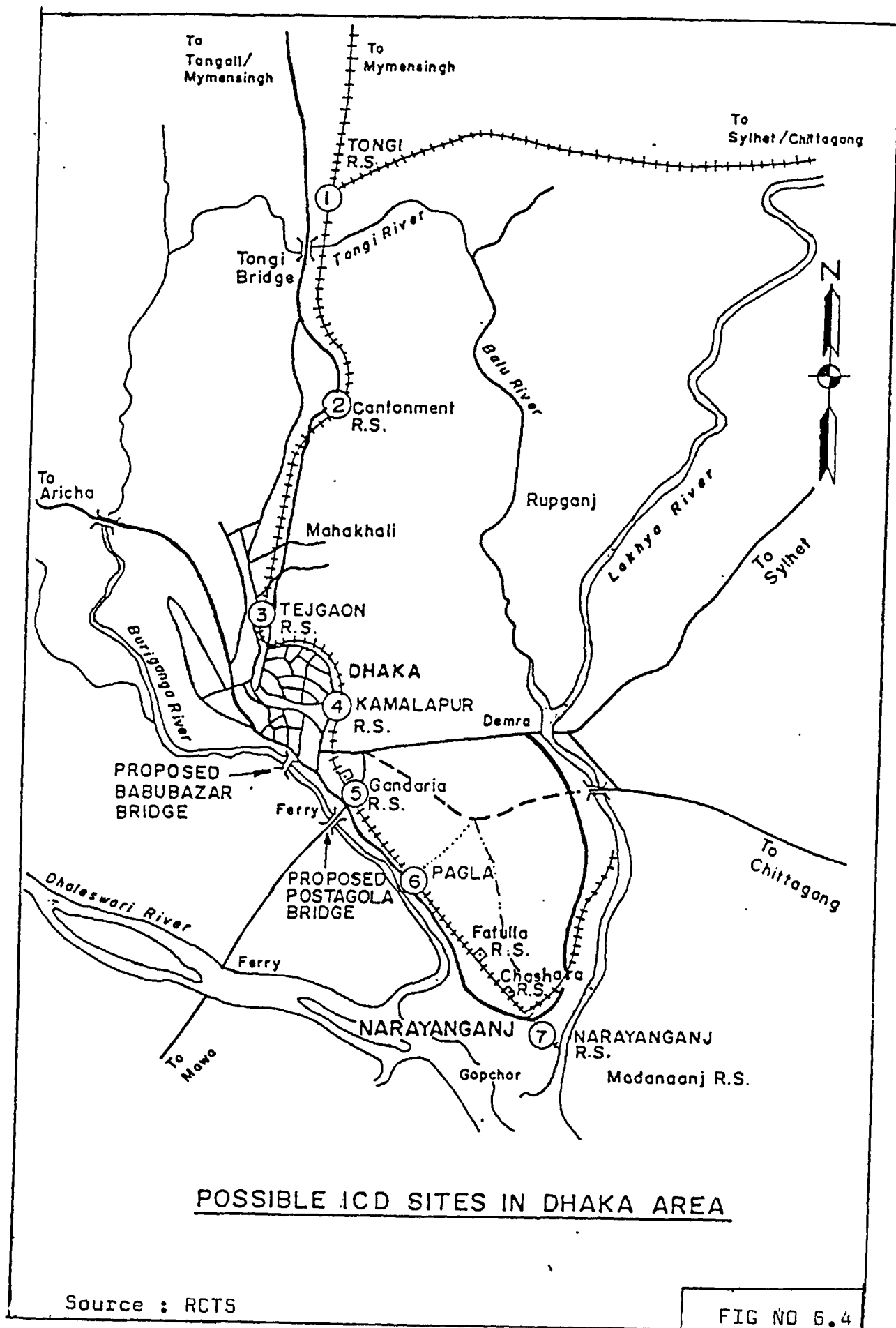
Bangladesh should look to the time when vessels upto this size can be accommodated . This may mean moving down river to a new site . The Maunsell '85 study had identified such a site at the mouth of the Karnafuli river .

#### ICD at Dhaka

The most important and essential development required for a rail container service is a purpose built Inland Clearance Depot (ICD) in the Dhaka area . A useful start has already been made by the provision of an

interim ICD at Kamalapur station . The following facilities are required at the ICD at Dhaka :

- a . An administrative building for ICD management , documentation and terminal control staff and to provide office accommodation for representatives of shipping lines or agents . .
- b . A railhead area where containers can be transferred to and from trains .
- c . Full container storage area , to accommodate all LCL and FCL traffic without physical segregation . Random access must be available for any particular container .
- d . Empty container storage to accommodate all empty containers , which should be stored in blocks segregated by owner and type .
- e . CFS for packing and unpacking LCL cargo and for customs examination of packages .
- f . FCL customs inspection and unloading area .
- g . Workshop for site machinery and railway wagon maintenance .
- h . Container repair area .
- j . Trailer parking area .
- k . An external vehicle holding area .



1 . A gate house to control access to and from the-site . (36)

Site Selection. In determining the choice of a site for a rail connected ICD , the principal factors involved are :

- \* Availability of land which should be in excess of 10 hectares .
- \* Present ownership of land - acquisition costs and planning problems .
- \* The ability of local road system to cope with increased levels of road traffic and to provide good access to industrial areas and customers premises .
- \* Accessability to inland water transportation .

Possible ICD sites at Dhaka area is shown in Figure 6.4 .

Kamalapur is the preferred choice - the land is already in railway ownership , therefore land acquisition costs and planning problems are reduced . Land available is 18.09 hectares . Extensive road improvements are planned in the area. (These must be carried out) . So the Kamalapur area meets the first three criteria but not the fourth . The ICD could serve IWT by operating road trucks in bond between the ICD and an appropriate jetty - probably at Pagla .

That Kamalapur has already been selected as the location for the pilot ICD is an added attraction in developing the full ICD on the same site . (37)

Handling Equipment. After evaluation of various types of container and cargo handling equipment and having regard to the characteristics of the site , the levels of traffic forecasts and the phases of development , it is recommended that the handling equipment should be such as to provide relatively high density container storage , so reducing the land area required to the minimum . Wheel loads should also be considered - high wheel loads results in the need to provide very heavy duty paving . Segregation of loaded and empty container storage allows use of light machines for handling empties , which are relatively inexpensive and require lighter paving .

For the rail terminal , electric rail mounted cranes are recommended , one initially and two by FY02-3 . A mobile crane will also be required to provide for emergencies . For loaded container storage , straddle carriers are recommended as they allow high density stacking , (a front loader is used now) . Medium capacity front lift trucks are considered most suitable for empties , which can be block stacked upto four high , saving space .

### Rail

New methods of train movement which are quite different from the traditional methods of railway freight operation will be required with the establishment of a modern rail container service between a port and an ICD . The new services are required to provide regular , fast and punctual trains between port and ICD , providing the customers with reliable services to a published time table while achieving high productivity of railway assets.

Wagons must be specifically designed for carriage of containers and dedicated to these traffic. The wagons must be formed into fixed formation trains which will not vary on a daily basis, but only over longer periods of time in response to long term traffic fluctuation. When several sets of rolling stock are in use at any one time, these sets should be identical in composition, and hence interchangeable.

The trains should ideally run directly between the port berth rail head and the ICD, with no intermediate shunting, marshalling or train examination. This would minimise pilferage of both the payload contents and the rolling stock components so common in Bangladesh.

High availability of well maintained, fully braked wagons must be assured. This could be possible with the container organisation undertaking its own wagon maintenance within the ICD complex.

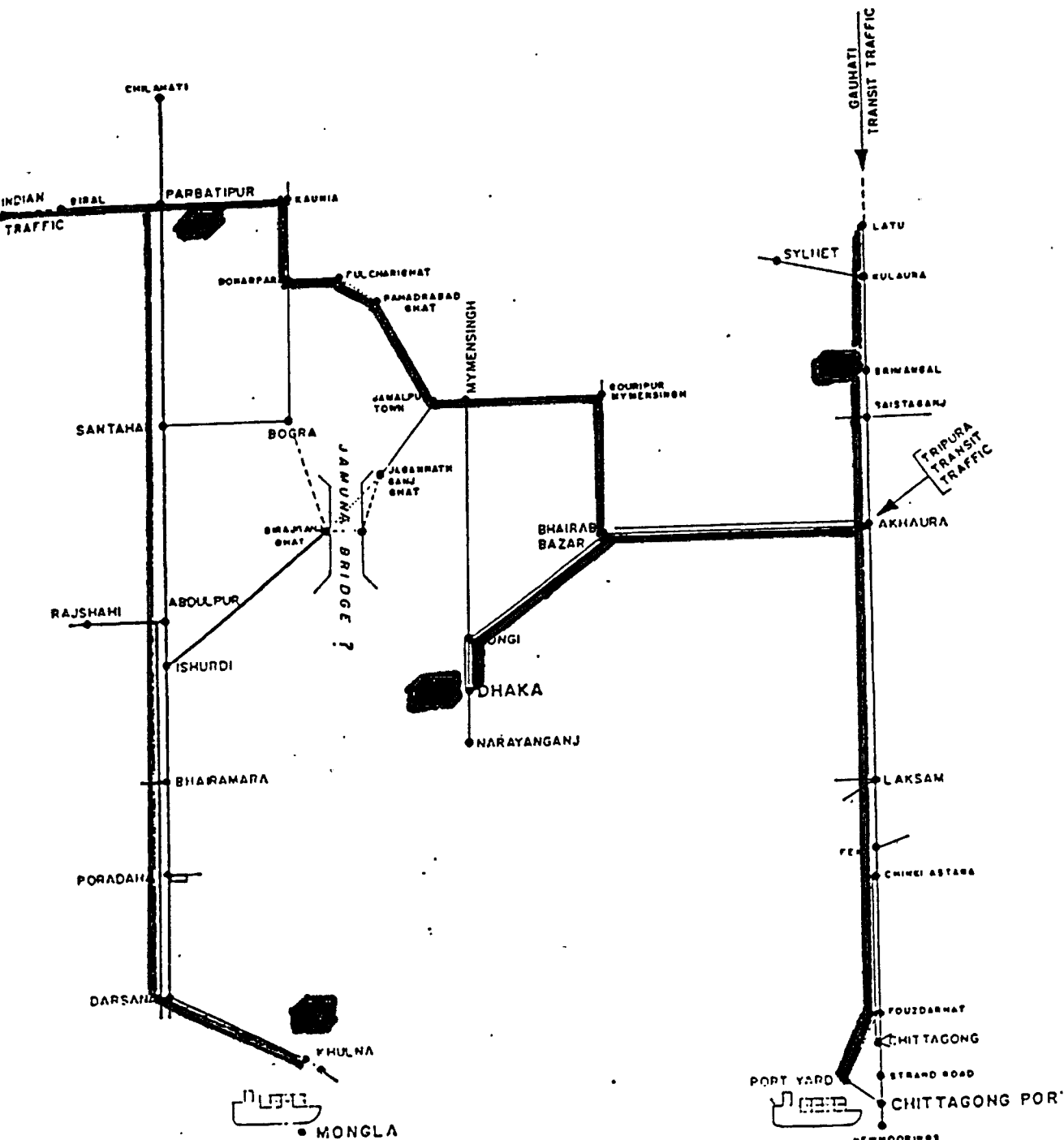
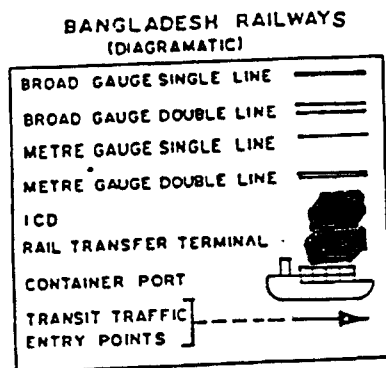
Trains should be planned to operate around 300 days per annum (6 days per week) which should allow for maintenance of container handling vehicles and equipment.

Rail facilities, for container trains, to be provided as part of the MPB development, comprise a two siding rail terminal with sidings of 250m, to be spanned by electric cranes. It will be necessary to split full length container trains between sidings on arrival as the sidings are of insufficient length. This limitation will impose certain constraints on the time-tabling of container trains and local train movement in Chittagong. The size and shape of the site, as presently planned, does not allow extension of the sidings.



# NATIONAL RAIL CONTAINER NETWORK

Likely Rail Flows   
Possible Rail Flows 



The rail facilities planned for the MPB would not be adequate for the number of containers forecast to be handled . Ultimately rail facilities for containers might be provided behind berth 14 as part of a later stage development . (38)

The likely and possible flow of containers by rail are shown at Figure 6.5 .

Wagons. Two options exist : Firstly , convert as many readily available four wheel bogie wagons possible and construct new wagons . (Train speeds would be restricted to 56 km/h) . This is the minimum cost option , but requires allocation of scarce resources at Pahartali railway works .

Secondly , purchase a fleet of new purpose built wagons which may or may not be compatible with the rest of the fleet . This course of action offers the potential for higher train speed and therefore greater rolling stock productivity .

By FY01-2 , the following wagon fleet would be required :

132 Four wheeler wagons	- 20' containers , weights below 18.5 tonnes .
24 bogie wagons	- 20' containers , weights
"short bogies"	above 18.5 tonnes .
96 bogie wagons	- 40' containers .
"Long bogies"	

We may reasonably assume the following sources of

these wagons :

- 132 - Converted CJ wagons .
- 24 - Converted Tank / BC / BCF wagons .
- 20 - Converted BFR wagons.
- 76 - New wagons , preferably purchased new or built at Pahartali .

The system could operate satisfactorily using wagons converted to an approved standard and this would be cheaper in capital terms than the option of purchasing new wagons . The latter of course is the superior technical option and is the option to go for if finances are available .

In general , the container service will look to BR to provide it with reliable well maintained locomotives from adjacent depots at appropriate times to operate the advertised train schedules .

**Strategy.** It is considered that current and planned improvements in the national road system under the urgency of upgrading rail freight services . Container services and unit trains for bulk commodities should receive priority in the allocation of line and other resources .

(39)

### **Chittagong**

The capacity of rail facilities needs to be adequate to accommodate the traffic volumes forecast using a pattern of rail services compatible with ICD requirements.

Maximum daily throughput for Chittagong would be constrained by train capacity and container mix . Average container per day forecast per day are 50 , 110 and 174 for FY92-3 , FY97-8 and FY02-3 respectively .The train-services therefore required would be 1 , 2 and 3 daily for these years and annual throughput of 19600 TEUs , 44000 TEUs and 72000 TEUs respectively .

Port rail facilities are part of a chain that must provide an integrated service , backed by modern communication system and transmission of documents .

Ability of the port area as a whole to absorb the number of loaded and empty containers requiring to be stored have to be considered . There would be requirements for equipment and hard standing for container storage . To reduce the number of containers in the port following would be required :

a . For loaded containers :

- \* improved customs procedures .
- \* rapidly rising storage tariffs after reasonable initial period and auction or disposal of goods after say 30 days , to discourage traders from excessive dwell times for imports .

b . Empties :

The storage of empties is influenced by : storage tariff levels , storage capacity , storage policy of leasing companies , tariff levels and storage availability at neighbouring ports , availability of capacity or shipping services , container demand in the

region , need for repair , etc .

Action should follow a survey of boxes by status , owner , type , etc to determine trends and influences . Action can then be directed at those responsible in such a way as to achieve the desired result .

Even after the MPB is in use some of the containers will still be handled in the conventional berths . Container traffic remaining in the conventional port will be influenced by the MPB , after allowing for the reduction in average dwell times resulting from use of the ICD , and the volume of the containers remaining in conventional vessels .

To allow movement of containers between the proposed MPB rail head and the conventional port CPA has proposed to provide a bridge across the Maheshkhal canal between berths 13 and MPB . This should be implemented .

Ultimately , rail facilities for containers might be provided behind berth 14 as part of a later stage development .

The CPA plan to provide electric rail mounted cranes for loading/unloading container trains , one initially and another when required (FY 02-3) .

It appears likely that the storage capacity of the MPB will be saturated shortly after commissioning in FY91-2 and that even allowing for substantial overspill into the conventional port area an overall deficit in container storage at the port will emerge around FY95-6 . One solution could be simply to extend storage into fur-

ther outlying areas of the port , but this would definitely lead to a fairly sharp fall off in efficiency and increase in equipment requirements . Congestion and dwell times would increase . Overall organisation at the port would come under strain , with impacts upon berthing and ship turnarounds .

Under these circumstances , the most likely requirement will be the development of a second MPB . The financial cost of a second MPB has been estimated at Tk 1925 million at 87-8 prices (US\$ 58.33 million approximately) (Maunssel '80 study and RCTS estimates) .

In the much longer term , consideration should be given for the provision of deep water berths at Patenga , beyond the airport , on the right bank of the Karnaphuli river , close to its mouth .

### Ships

Ships operating in the Indian Sub Continent and East Africa is shown in Table 6.3 . Combo vessels are prominent on these and other developing country trades . The break-bulk cargo carried slows down load and discharge times and is also a limiting factor in the size of the Combo vessels, they have a low productivity level. Ships of this size do not benefit from the economies of scale . Combos attract developing countries for several reasons : they allow a limited number of containers to be handled and provide a back-stop for break-bulk operating if container control goes away ; they come in relatively small units and therefore do not require investment in large lumps ; they are flexible as to types of cargoes carried. In practice these advantages are more apparent than real.

The geared cellular vessel is very flexible as to the types of cargo it can handle and has a much greater handling productivity level . It does not have to be large , but at sizes above 1000 TEUs have achieved significant economies of scale . This advantage will be maximised if concentrations of cargo can be achieved by service rationalisation .

It is usually better to go for geared cellular vessels and not for Combos (Containerisation in the Eighties by M G Graham and D O Huges '85) . Bangladesh should opt for the geared cellular type when acquiring ships for its fleet .

**Table 6.3**

**Ship Profile in Selected Developing Country Trades**

	Indian Subcontinent		East Africa	
	Ships	TEUs	Ships	TEUs
Full Container	10	8000	4	4900
Bulk Container	6	6500	3	3800
Ro Ro	2	2800	-	-
Semi Container (Combo)	21	6600	12	4850
Converted Cellular	3	2900	1	920

Source: Containerisation in the Eighties by M G Graham and D O Huges '85 .

Ports in Bangladesh will probably be served only by feeder vessels from major container ports of Singapore Madras and Colombo because of a less favourable geogra-

phical location . While the big fully cellular container ships only serve a few main ports . Small feeder vessels operate between these ports and a certain range of ports at some distance moving comparatively small amounts of containerised cargo .

Bangladesh's container trade is now almost entirely by feeder services - COBRA , SCI , etc.

Feeder vessels could be small container ships having only little draft . They would be the right choice for services operating into or out of small or not so big ports like Mongla and Chittagong without deep water channels and berths .

Bangladesh therefore should go for feeder vessels which can carry upto 300 TEUs having a length varying between 80 to 120 metres . Ports in Denmark , Norway , Sweden and Finland are regularly served by such feeder vessels , operating mainly from Bremerhaven and Hamburg . (Container Vessels and Fleet Type by J Neubert in Port Management Textbook - Containerisation) .

### Training

A large programme of training will be required , as this will be the first time , that a fully developed system of container rail transport and ICD will be operational in Bangladesh .

Senior management appointments should be made as soon as the organisation to manage the rail container transport and ICD is agreed . Senior managers and engineers may require some overseas training . Training will



also be necessary for ICD and rail supervisory , operations , maintenance , security and office staff . Exhaustive training programmes have to be arranged for the staff as follows :

- a . Working procedures .
- b . Container train operation .
- c . Operation and maintenance of container handling equipment .
- d . Operations within the ICD .
- e . Handling of emergencies such as accidents , pilferages , etc .
- f . Procedures for dangerous and hazardous goods , etc.

#### Minimum Requirements for Workability

It is not possible to fulfil and bring about all the changes desired immediately due to financial and other constraints . The changes will have to be brought about in stages as finance and resources are made available . The changes have to be prioritised and the development carried out in phases .

The consultants in the BIWTA study , Transport of Containers in Bangladesh - Feasibility Study and Detailed Engineering , '85 , had recommended that initially , rail and IWT transport should be provided from Chittagong and IWT from Mongla . They expected that later road transport would take an increasing share , provided that the bridge upgrading programme continues . They had recommended the ICD to be at Pagla and its design should be flexible so that it could in later phases accommodate different modal proportions of transport if the demand trends change or

experience shows that one particular method is to be preferred .

The consultants in the RCT Study , Bangladesh , '87 have recommended that a rail based inland container distribution system be established in the Dhaka -Chitta -gong corridor .

Both the consultant groups have shown preference for rail based inland distribution .

Because of the reasons discussed in the earlier chapters the rail based internal distribution system is the preferred choice for the internal distribution of containers in Bangladesh . A start has already been made with the introduction of the interim ICD at Dhaka in '87.

For the rail based inland container distribution system the minimum requirement for workability are :

- \* provision and completion of a permanent ICD in Dhaka in Kamalapur .
- \* provision of unit trains services for containers between Chittagong port and Dhaka .
- \* completion of the MPB project with the rail terminal as soon as possible .
- \* Initiation of institutional measures ( regulat - ions , procedures and documentation ) for efficient operation of container services .

In the RCTS designs and operational layouts have

been developed for the rail container service and Dhaka ICD at Kamalapur . It is proposed that the project be implemented as recommended by the consultants .

The phased development plan and the estimates of capital and operating costs as calculated by the consultants are summarised in the next chapter .

Other developments should not be neglected and must be carried out at an even pace by the Roads and Highways Department , BIWTA , BSC , Port Authorities , and other related departments .

#### REFERENCES TO CHAPTER VI

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- (29) Rail Container Transport Study - Bangladesh , Draft Final Report , Prepared for Asian Development Bank acting as Executive Agency for UNDP - September '87 .
- (30) (31) (32) (33) As cited in (29) above .
- (34) Kappel R - Inland Transport Network , in Port Management Textbook - Containerisation . Institute of Shipping Economics and Logistics '85 .
- (35) (36) (37) (38) (39) As cited in (29) above .

CHAPTER VII  
DEVELOPMENT PLAN  
AND  
COSTS OF RAIL CONTAINER SERVICE AND THE ICD

Development Plan

The proposed rail container project is composed mainly of the ICD and the railway service . These should provide the following :

- a . Rail container services between railheads at Dhaka ICD and Chittagong Port .
- b . Handling , storage and customs clearance of containerised goods at Dhaka ICD .
- c . Collection and delivery of containers and containerised goods between Dhaka ICD and customs premises .

Following has been assumed :

- a . CPA would carry out the movement of containers between the port railhead , stack and quayside at Chittagong.
- b . BR would operate and maintain the railway infrastructure between Dhaka and Chittagong . ( the railway track , signalling and telecommunications , etc ) .

c . Private road hauliers would undertake local distribution of containers and containerisable goods between Dhaka ICD and customers premises.

To keep the capital and operating costs of the project within affordable limits the development has been planned to be carried out in three phases, with capacity beginning at fairly modest levels in Phase I and then gradually being expanded in Phases II and III to accommodate rising throughputs . The phased investment programme is as follows :

Phase	Years	Main Components	Capital Costs
I	FY90-1 to FY92-3	Initial development of the ICD and rail container service .	Tk 366m
II	FY97-8	Purchase of additional handling equipment , plus modest site extension works .	TK 109m
III	FY02-3	Purchase of additional handling equipment .	TK 151m
			-----
			Total - Tk 626m

### Capital Costs

Total capital costs over the three phases of the project are estimated at Tk 626 million , of which Tk 366 million would be for Phase I , Tk 109 million for Phase II and Tk 151 million for Phase III . In the first phase

there would be need for major civil works for site development , along with advance ordering of certain of larger container handling equipment . The overall capital costs for each phase are summarised in Table 7.1 .

An analysis of the capital expenditure shows that the majority of the project expenditure would be for development of site and facilities at Kamalapur and procurement of container handling equipment . The necessity of providing re-inforced pavements for container yards and specialised equipment , for container transfer on/off trains and within the ICD ( cranes , straddle carriers and fork lifts ) means that major expenditures in these categories are unavoidable .

Project capital costs would not cover the direct acquisition of land in Dhaka , railway rolling stock or equipment and facilities at Chittagong . Following has been assumed :

- a . Land would be rented at Kamalapur site because of very high land acquisition costs .
- b . Railway locomotives and rolling stock would be provided for by BR on the basis of an annual charge for depreciation and interest .
- c . No allowance is made for related capital outlays within Chittagong Port ( for improving container movement inland of Chittagong ) . It is expected that one of the benefits of the project would be to alleviate congestion in the port and over the longer run this might enable net reductions in capital outlays at the port .

TABLE 7.1  
SUMMARY OF CAPITAL EXPENDITURE

	PH I			PH II	PH III	Overall
	FY 90-91	FY92-3	Total	FY97-8	FY02-3	Total
Civil Works	42	125	167	58	5	230
Container Hand ling Equipment	40	119	159	51	146	356
Railway Work- shop Equipment	3	9	12	-	-	12
Priliminary Expenses	5	15	20	-	-	20
Working Capital	-	8	8	-	-	8
<b>Total</b>	<b>90</b>	<b>276</b>	<b>366</b>	<b>109</b>	<b>151</b>	<b>626</b>

Source : Consultants estimates in RCTS .

TABLE 7.2  
ANNUAL RENT

	Phase I	Phase II	Phase III
Land area ha	12.8	17.4	18.09
Rental per annum	7280	9905	10304
(1 ha = 2.471 acres or 35582 sft)			

Source : Consultants estimates in RCTS .

**TABLE 7.3**  
**SUMMARY OF EQUIPMENT FINANCIAL OPERATING COSTS (TK '000)**

ITEM	FY92-3		FY97-8		FY02-3	
	No	Cost	No	Cost	No	Cost
Rail Transfer Crane	1	887	1	892	2	1779
Straddle Carriers	2	4335	2	4902	3	7352
Tractors	6	1984	8	2725	11	3785
Trailers 20 ft	12	308	22	565	30	771
Trailers 40 ft	15	514	24	822	37	1267
Forklifts 2.5T	15	2110	35	4834	42	5847
Forklifts 5T	5	1956	10	3912	14	5704
Front Loaders	2	992	3	1573	3	1743
Mobile Cranes	1	502	2	935	2	958
Workshop	1	1780	1	1780	1	1780
Computer System	1	2055	1	2055	1	2055
<b>Total</b>		<b>17422</b>		<b>24955</b>		<b>33041</b>

Source : Consultants estimates in RCTS .

**TABLE 7.4**  
**SUMMARY OF EQUIPMENT OPERATING COST COMPONENTS (%)**

	FY92-3	FY97-8	FY02-3
Maintenance	81	75	74
Fuel	11	15	16
Lubrication	2	3	3
Power	2	2	2
Liquid gas	3	5	5
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source : Consultants estimates in RCTS .



### ICD Operating Costs

Land Rent . BR allows rental of its land for the purpose of commercial use .

Considering the prevailing rate of Tk 16 per sq ft per annum , the annual rental of land for each of the years of Phases I , II and III has been estimated in Table 7.2 . Phase I requires a site area of approximately 13 ha equivalent to a annual rental of Tk 7million . In Phase II site area would rise to 17 ha approximately with rental cost of slightly less than Tk 10 million . Phase III site area would be 18 ha approximately , costing roughly Tk 10 million .

Equipment Operating Costs . Equipment operating costs have been estimated for each equipment item . Components of operating costs include , as appropriate , costs of maintenance , fuel , lubricating oil , power and liquid gas . Annual maintenance costs have been calculated as a percentage of capital costs , while costs of other items have been based on estimates of unit input requirements . Future diesel oil costs have been assumed to be Tk 9.45 per litre. The total annual equipment operating costs are summarised in Table 7.3 .

Within the overall annual equipment costs the largest component is maintenance , which amounts to between 75 to 80% of operating costs . This demonstrates the critical importance which would need to be attached to maintenance in order to ensure efficient services without requiring to have a large provision for backup equipment. The components of equipment operating costs are summarised in Table 7.4 .

The growth in fuel allocations reflect the relatively higher proportions of mobile equipment , such as fork lifts , tractors and trailers , as traffic throughputs rise at the ICD .

ICD Staff Costs . Summaries of staffing and costs by main staff section are set out in Table 7.5 . The salary levels allowed are slightly higher than those of BR , keeping the remuneration sufficiently attractive for dedicated and skilled personnel . This reflects the requirements and costs of operating the ICD on a commercial basis , more comparable with the Bangladesh private sector .

ICD Administrative Costs . To cover all ICD administrative costs including office running and day to day maintenance expenses , marketing and promotion expenses etc , a modest provision amounting to 30% of ICD staffing cost has been assumed . This amounts to Tk 4 million in FY92-3 , Tk 7 million in FY 97-8 , and Tk 9 million in FY02-3 on the basis of the staffing costs in Table 7.5 .

Civil Works Maintenance . For proper up-keep and maintenance of all civil engineering items , annual maintenance costs have been estimated on the basis of a percentage of capital costs , with allowances for individual components ranging from .1% to 10% . The overall average maintenance allowance with respect to the total capital costs is roughly .6% . On this basis the annual civil works maintenance costs would be just under Tk 1 million in Phase I and slightly more than in Phase II and III .

TABLE 7.5  
SUMMARY OF ICD STAFF COSTS

	FY92-3		FY97-8		FY02-3	
Staff Section	Staff No	Cost	Staff No	Cost	Staff no	Cost
Management	6	750	6	750	6	750
Clerical	20	1200	42	2480	68	4000
Cargo Operations	108	5260	206	9980	288	13800
Train Handling	4	180	6	270	8	360
Maintenance	45	2150	88	4160	124	5780
Security/Gen Svcs	61	2585	103	4320	121	4920
Total	244	12125	451	21960	615	29610

Source : Consultants estimates in RCTS .

TABLE 7.6  
SUMMARY OF RAILWAY OPERATING PROFILE

	FY92-3	FY97-8	FY02-3
Trains per Week	6	12	18
Crews	10	20	25
Annual Km '000	198	396	594
Train Set Nos	2	4	5
Locomotive allocation	2.5	5	7.5
Short Bogies	10	19	24
Converted Long Bogies	20	20	20
New Long Bogies	9	52	76
Four Wheel Wagons	55	110	132

Source : Consultants estimates in RCTS .

### Railway Operating Costs

Railway costs are based on providing a dedicated rail container service between Dhaka ICD and Chittagong Port without stops at intermediate points . Since this service would differ from those of existing BR services , BR average cost and performance data was not used . Separate estimates of operating costs were made by the consultants . Table 7.6 summarises the main aspects of rail operation for costing purposes .

A summary of railway operating costs are provided in Table 7.7 for the selected years . Total railway operating costs rise from Tk 35 million in FY92-3 to Tk 77 million in FY97-8 to Tk 110 million in FY02-3 .

Annual railway costs are composed of capital charges on rolling stock , and variable operating costs of running container services . Rolling stock is generally procured through foreign donor assistance , and then on lent to BR by GOB . Capital charges have been based on the existing method by which GOB calculates its required levels of return for rolling stock secured on behalf of BR .

Depreciation . Depreciation is on straight line basis taking into account the cost of the scrap value ( total acquisition costs minus scrap value ) and expected life of the rolling stock . The rolling stock depreciation is shown at Table 7.8 .

Interest . The interest rate is 6.5% p a of the capital acquisition costs .

**TABLE 7.7**  
**SUMMARY OF ANNUAL RAILWAY OPERATING COSTS (TK MILLION)**

	FY92-3	FY97-8	FY02-3
Depreciation	6.8	16.1	22.7
Interest	7.8	18.8	27.0
Maintenance	5.7	12.0	17.4
Crew	0.8	1.6	2.0
Fuel	7.5	15.0	22.5
Train Examination	0.4	0.8	1
Insurance Provision	2.7	6.4	9.2
Overheads	2.9	5.9	8.6
<b>Total (rounded)</b>	<b>35</b>	<b>77</b>	<b>110</b>

Source : Consultants estimates in RCTS .

**TABLE 7.8**  
**COST OF ROLLING STOCK DEPRECIATION TK IN '000S**

	Unit Econ- omic Cost	Scrap Value	Net Econ- mic Cost	Expected Life (Yrs)	Depreciat- ion Amount
Locomotive	33000	3300	29700	20	1485
Four Wheelers	202	20	182	10	18
Short Bogies	326	33	293	10	29
Long Bogies (cnvtd)	326	33	293	10	29
Long Bogies (new)	825	82	743	20	37

Source : Consultants estimates in RCTS .

Maintenance . Unit maintenance costs have been based on the consultants estimates of annual labour plus spare parts requirements for each rolling stock types . The maintenance costs per unit per annum are :

Locomotive	: Tk 1894m
Converted 4 wheel wagons	: Tk 8m
Converted short/long bogies	: Tk 21m
New long bogies	: Tk 16m
( with duty sales tax etc on spares )	

Crew Train crew costs are based on annual costs per crew of Tk 80000 and an average of 5 crews per train for 56 Km/hr on 8 hr shift basis . Thus the annual expenditure per train set stands at Tk 400000 .

Fuel . Fuel costs assume a future price of diesel fuel of Tk 9.45 US\$ 20 ( based on a projected future oil price of US\$ 20 per barrel ) . Locomotive fuel consumption is estimated to be 4 litres/Km ,the average fuel cost would be Tk 37.80 per Km .

Insurance . Insurance cost has been assumed to be a provision of 2% of the total capital cost of annual train sets in operation .

Overhead . To cover BR infrastructure costs and other overhead costs to be availed by the proposed container service , a contribution of 20% of direct cost has been assumed . This would be in addition to full capital charges provision in the form of depreciation and interest costs .

### Development Programme

Effective implementation of the project for an efficient system for container transport by rail is important for BR and the economy of Bangladesh . Careful planning and execution of the project deserves high priority .

The main components of the project are :

- \* Preparatory action by BR .
- \* Construction of the ICD including equipment provision .
- \* Organisation and institutional procedures .
- \* Container train operation .
- \* Training :

Preparatory action which should be taken up by BR , as soon as the project is approved in principle and a source of funding is identified are : clearance of site , arrangement for supply of about 6700 tonnes of scrap for heavy duty pavements and 60 lb/yd rails and other track materials at the site of ICD .

The various items of construction in Phase I involve :

a . 31673 sqm of heavy duty pavement . This will require 13000 cum of cement concrete and cutting/fixing of 67000 tonnes of scrap rails . The work should be completed in about 350 working days .

b . 732.14 sqm bitumen carpet pavement . This should also be finished in 350 working days .

c . RCC beams and track for rail transfer gantry

crane , 450m long , involving pre casting and driving of RCC piles and plinth beams .

d . Customs wall and drainage system involving 5000 cum of brick masonry and mass cement concrete .

e . CFS shed , workshops , and other sheds involve fabrication and erection of 350 tonnes of MS sections and 100 tonnes of scrap rail .

f . Administrative building having a floor area of 1500 sqm , including partitioning , furnishing , etc .

g . Railway sidings involve laying of about 3000m of 60 lb/yard track and 12 points crossing .

Completion of various items of work will require 200 to 400 working days . Allowing for loss of man days due to monsoons , holidays , festivals , etc the works can be completed within a realistic target period of two years . An additional time of 12 months should be allowed for appointment of consultants and preparation of drawings , design , tender schedules and progressive award of contracts .

To ensure completion of the works in scheduled time , it would be necessary to split it up into a number of contracts .

To allow civil engineering design construction to take place , operating and system design requirements must be established for the ICD in greater detail . Operational planning staff need to work alongside the engineering team so that operating requirements are fully met.



The requirements for container trains , organisation , institutional procedures and training have already been discussed earlier .

The activities of staff recruitment , training , marketing and promotion , administration and documents would obviously be integrated with and supported by the interim ICD operators .

These diverse activities could best be coordinated within the government administration . It is suggested that the existing National Containerisation Committee be charged with the task of coordinating and monitoring the ICD project in all its aspects . This may be done by requesting regular reports from concerned organisations and holding joint liaison meetings every three months to review the progress and decide on the targets for the next three months .

### Technical Assistance

The funding agreement should make adequate provision for technical assistance in a number of areas , such as :

- a . Detailed design and drawings for the construction of ICD , including tender documents .
- b . Specification tender documents and procurement and commissioning of container handling equipment.
- c . Operation and maintenance of containers , handling equipment .

d . Preparation of instruction manuals for staff and guidance manuals for clients .

e . Professional advice on commercial practices , simplification of trade procedures , Freight forwarding , customs procedures , documentation , marketing and financial management .

f . Container train operation for a limited period, say 9 to 12 months .

g . Designing of training programmes and undertaking training .

A development time table in bar chart form is set out in Figure 7.1 .

### Project Feasibility

The project has a financial Internal Rate of Return (IRR) of 15% and an economic IRR of 13% as calculated by the RCTS consultants . Financial and economic Net Present Values (NPV) are Tk 7 million and negative TK 15 million respectively over the life of the project . Such levels of return are considered broadly consistent with present criteria for project acceptability in Bangladesh .

The project is sensitive to changes in key variables , which in particular demonstrates the initial importance of institutional measures to overcome sources of delay and inefficiency .

DATE OF FUNDING AGREEMENT																		
Sl.No.	PROJECT MONTH NUMBER →	12	9	6	3	0	3	6	9	12	15	18	21	24	27	30	33	36
1.	PREPARATORY ACTION BY BR	////	////	////	////													
2.	CIVIL ENGINEERING WORKS																	
2.1	APPOINTMENT OF CONSULTANTS					////												
2.2	DRG. DESIGN, TENDERS						////	////										
2.3	APPOINTMENT OF CONTRACTORS								////									
2.4	CONTRACTS FOR CIVIL WORKS									////	////							
2.5	EXECUTION OF CIVIL WORKS									////	////	////	////	////	////	////	////	////
3.	MACHINERY & EQUIPMENT																	
3.1	SPECIFICATION & TENDER						////											
3.2	CONTRACTS FOR ITEM (3)									////								
3.3	SUPPLY & COMMISSIONING OF (3)											////	////	////	////	////	////	////
4.	CONTAINER WAGONS																	
4.1	SPECIFICATIONS & TENDERS FOR PARTS/NEW ROLLING STOCK						////											
4.2	CONTRACTS FOR (4.1)									////								
4.3	SUPPLY/MANUFACTURE WAGONS											////	////	////	////	////	////	////
5.	TRAINING													////	////	////	////	////
KAMALAPUR ICD PHASE - I BROAD TIMETABLE FOR EXECUTION OF PROJECT																		
																		FIG-NO 7.1

Source : RCTS

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## CHAPTER VIII

### CONCLUSIONS AND PROPOSALS

#### Conclusions

The principal conclusions are as follows :

\* Serious problems of retarded agricultural and industrial development , family planning and the effective development of resources still attend the Bangladesh economy . Simultaneous growth in agriculture and manufacturing is needed together with heavy investments in transport and energy infrastructure . Economic growth must be high and sustained .

\* With few exceptions the educational elite has shown little managerial talent and practical sense , and a lot of modern machinery and equipment remain unused and get destroyed due to organisational weaknesses , as well as a weak sense of importance of maintenance .

\* Bangladesh's balance of payments remain precarious . In monetary terms exports have risen more slowly than imports , of which foreign aid pay for about half . Most of the Annual Development Programme ie government financed investment and other development expenditure is still financed by foreign aid .

\* Maritime containerisation has grown rapidly in Bangladesh reaching a total of approximately 50000 TEUs in FY85-6 after a relatively slow start in '80 .

\* Majority of import containers move through Chittagong port , but Mongla port handles a substantial volume of export containers - mostly jute . Chittagong alone currently handles 84% of Bangladesh's containerised tonnage , 50133 TEUs in FY86-7 .

\* There is a lack of infrastructure for distribution of seaborne containers in Bangladesh which is causing damage and delay to cargo and adds to port congestion and extra costs to importers and exporters . This is denying them the full benefits of containerisation . If this state is not remedied , the effectiveness of the new MPB being constructed in Chittagong will be reduced . Completion of the MPB project must be expedited .

\* The containerised traffic is forecast to grow rapidly at Chittagong and Mongla ports , as further cargo is containerised . 154000 TEUs pa and 252000 TEUs pa and 360000 TEUs pa are forecast to be handled at Chittagong port by the years FY92-3 , FY97-8 and FY02-3 respectively. Of these some 55% of the container traffic originates from or is destined for the Dhaka region .

\* It is indispensable for Bangladesh to extend , modernise , and optimise her port and other infrastructural facilities and operational capabilities for container traffic .

\* Only very limited prospects exist for containerisation outside the Chittagong-Dhaka corridor .

\* In short to medium term there are no prospects of Indian or Nepalese transit traffic through Bangladesh .

There are only long term prospects of transit trade with Nepal and there is a strong political desire within Nepal for this . More consideration is currently being given to the prospects for using Mongla as an alternative transit port for Nepal .

\* In the short to medium term , there are prospects for provision of a small ICD at Srimongal for export tea traffic

\* A rail container service and associated ICD in Dhaka is expected to attract over 50% of the various categories of container traffic . A rail based container service enjoys certain inherent advantages , but the rail service operation must be reliable and efficient .

\* The most suitable site for an ICD at Dhaka is at Kamalapur , where over 18 Ha of BR owned land beside the main passenger station is available . There is no other suitable site for the purpose at Dhaka at which both rail and IWT facilities can be provided at reasonable cost .

\* The ICD could be constructed at the Kamalapur site which would be capable of modular expansion , in phases , to a capacity of approximately 78000 TEUs pa .

\* Capacity is likely to be available for container trains between Chittagong-Dhaka subject to some constraints on timing . A unit train service can be provided between Chittagong and Dhaka commencing with 2 trains weekly for the interim ICD and rising to 3 trains in each direction by FY02-3 .

\* If the project is to be viable and compete effecti-

vely with other modes , then efficient commercially oriented management and operation of the ICD and rail service are a must .

\* Parallel changes are required in institutional regulations , procedures and documentation which are obstacles to door to door container movement . These changes will have to be extensive to allow the rail container services to operate the way it has been proposed . These involve many public bodies including customs . These changes can be brought about progressively in advance of the full project implementation .

\* Benefits arising from the project include not only in transport cost savings but also other substantial indirect benefits . These are reduction in inventory costs and foreign interest payments associated with imports and exports and reduced handling requirements at Chittagong port because of the reduced port dwell times for containers using the ICD .

\* The introduction of a computer system at Chittagong port is essential for efficient handling of containers .

\* Investment in the ICD and associated rail services is estimated as follows :

Phase 1	-	Taka 276 million
Phase 2	-	Taka 109 million
Phase 3	-	Taka 151 million



### Proposals/Recommendations

It is proposed / recommended that :

\* The rail based inland container distribution system with a permanent ICD in Dhaka and scheduled rail service be introduced in the Chittagong-Dhaka corridor as has been recommended by the consultants in the RCFS .

\* Early approval be given to the proposed development programme so as to ensure the early clearance of the ICD site .

\* After necessary approval and arrangement of funds , early steps be taken for arranging the necessary engineering design and technical assistance for rail and ICD operational planning , management , organisational and institutional development .

\* The service and facilities be designed to be as flexible as possible because of the dynamic nature of the container business . This would require :

- Flexible train service planning to accommodate long and short term fluctuations in port throughputs.

- Flexible terminal and equipment provision through modular expansion of Dhaka ICD and other terminals , in line with traffic growth .

- Flexible tariff structure and marketing approach to accommodate changing competitive relationships with road transport . Changes in customs procedures

and commercial practice will influence the market position of a rail based system .

\* The existing National Containerisation Committee be charged with the task of monitoring and coordinating with the various planning and executing authorities at the national level including the ICD project .

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